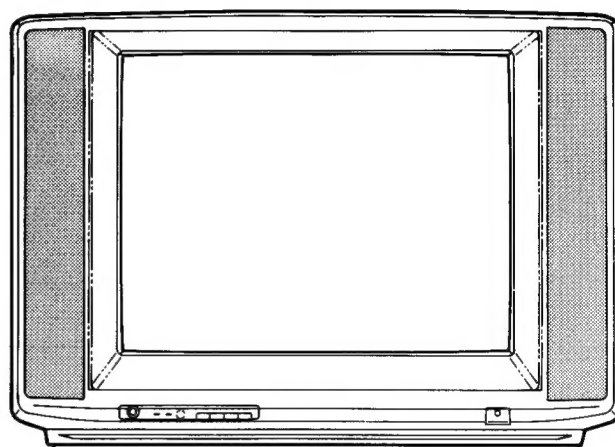


# TOSHIBA

## COLOUR TELEVISION

# 2112DDT



### SPECIFICATIONS

Input Power Rating:	AC 220 volts, 50 Hz	123W
Aerial Input Impedance:	75 ohm unbalanced type for VHF and UHF	
Receiving Channels:	PAL B/G Standard, SECAM B/G Standard:	
	VHF .....	channels 2 to 4, 5 to 12, S1 to S20 and S20 to S41
	UHF .....	channels 21 to 69
	PAL D/K, SECAM D/K Standard:	
	VHF .....	channels 1 to 12
	UHF .....	channels 21 to 69
	PAL, SECAM 50 Hz / 60 Hz (For Video Disk playback)	
	4.43NTSC (For VCR playback), 3.58/5.5 NTSC (For VCR playback)	
Intermediate Frequencies:	Picture I-F carrier frequency .....	38.9 MHz
	Sound I-F carrier frequency .....	
	B/G System .....	33.4 MHz
		33.16 MHz
	D/K System .....	32.4 MHz
Picture Tube:	21 inches, A51EAL30X01, 510 mm (measured on diagonal of viewable picture area), 90° deflection	
Sound Output:	10.0 watts (at 10% harmonic distortion) x 2	
Speakers:	120 mm x 60 mm, 2 pcs	
Aux. Terminals:	Headphone Jack, 21 pin socket, S-VIDEO/AUDIO socket, External speaker terminal, AUDIO / VIDEO input socket	
Cabinet:	Table type	
Dimensions:	Height .....	463 mm
	Width .....	654 mm
	Depth .....	489 mm
Weight:	21.5 kg	

Specifications are subject to change without notice.

## SAFETY INSTRUCTIONS

**WARNING:** BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

### X-RAY RADIATION PRECAUTION

1. The E.H.T. must be checked every time the receiver is serviced to ensure that the C.R.T. does not emit X-ray radiation as result of excessive E.H.T. voltage. The nominal E.H.T. for this receiver is 26.3 kV at zero beam current (minimum brightness) operating at 220V a.c. The maximum E.H.T. voltage permissible in any operating circumstances must not exceed 27.5 kV. When checking the E.H.T., use the 'High Voltage Check' procedure in this manual using an accurate E.H.T. voltmeter.
2. The only source of X-RAY radiation in this receiver is the C.R.T. To prevent X-ray radiation, the replacement C.R.T. must be identical to the original fitted as specified in the Parts List.
3. Some components used in this receiver have safety related characteristics preventing the C.R.T. from emitting X-ray radiation.  
For continued safety, replacement component should only be made after referring the Product Safety Notice below.

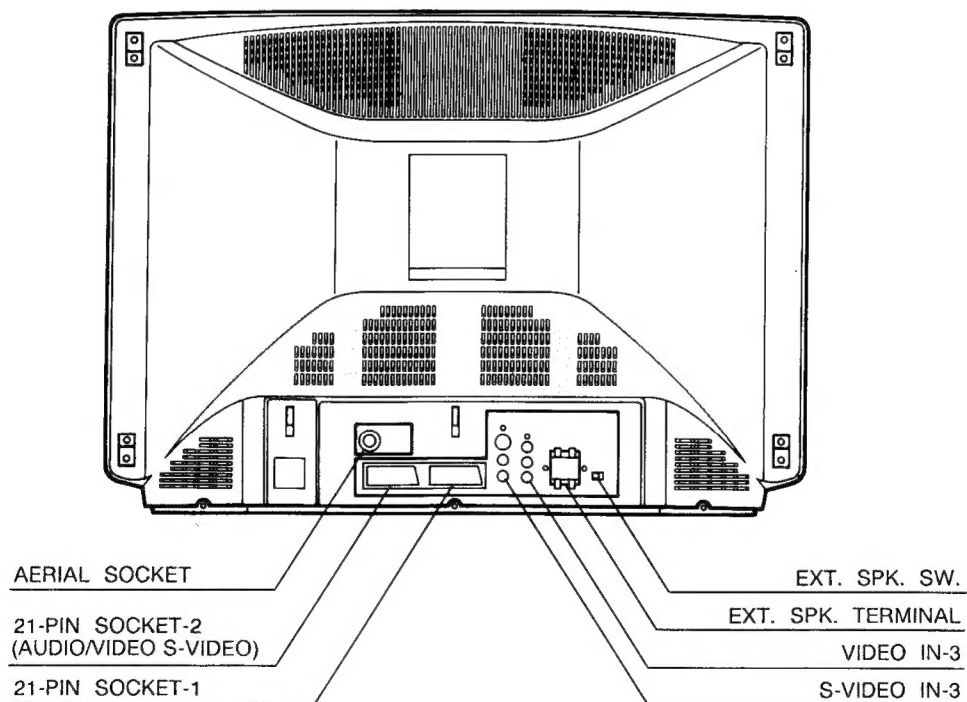
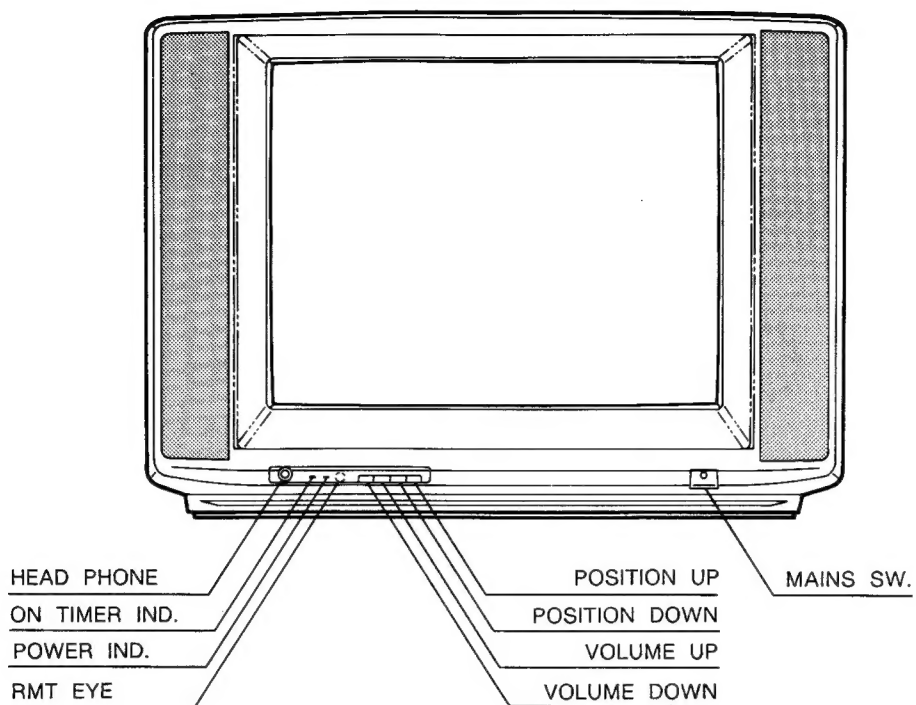
### SAFETY PRECAUTION

1. This receiver has a nominal working E.H.T. voltage of 23.5 kV. Extreme caution should be exercised when working on the receiver with the back removed.  
Do not attempt to service this receiver if you are not conversant with the precautions and procedures for working on high voltage equipment.  
When handling or working on the C.R.T., always discharge the anode to the receiver chassis before removing the anode cap.  
The C.R.T., if broken, will violently expel glass fragments. Use shatter proof goggles and take extreme care while handling.  
Do not hold the C.R.T. by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all cable forms be replaced exactly as supplied from factory.
3. A small part of the chassis used in this receiver is, when operating, at approximately half mains potential at all times. It is therefore essential in the interest of safety that when serving or connecting any test equipment the receiver should be supplied via a suitable isolating transformer of adequate rating.
4. Replace blown fuses within the receiver with the fuse specified in the parts list.
5. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be a Toshiba approved type and must be mounted as the original.
6. Keep wires away from high temperature components.

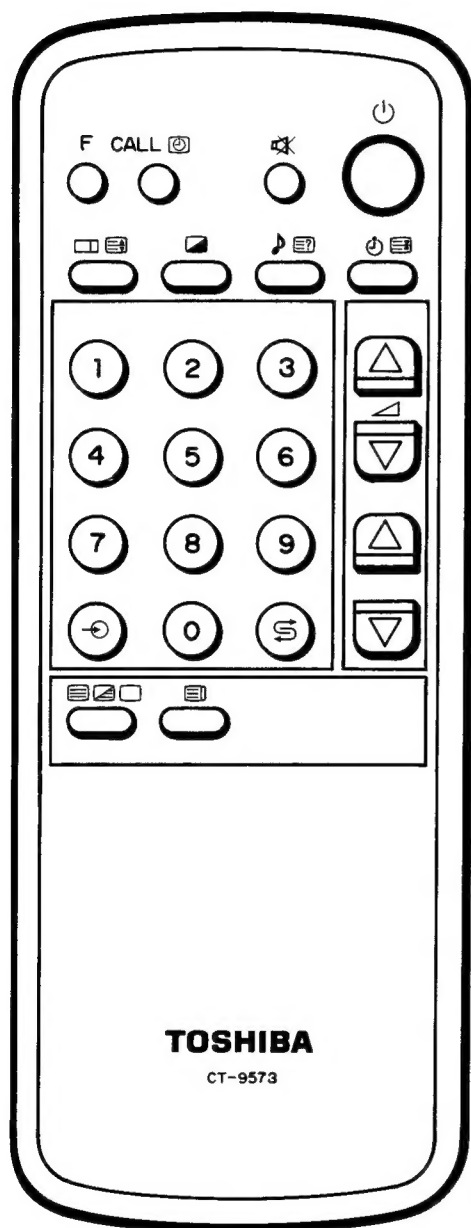
### PRODUCT SAFETY NOTICE

Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the schematic diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

## FRONT CONTROLS AND REAR VIEWS



# REMOTE HAND HELD UNIT



## KEY ASSIGNMENT

⏻	.....	ON STANDBY	🔇	.....	MUTE
CALL	.....	CH. DISPLAY CALL [ +F ; TIME DIAPLAY 📺 ]			
F	.....	DOUBLE PUSH OPERATION KEY (TEXT CONCEAL, QUICK & SERVICE MODE)			
RED	.....	MENU <TV> TUNING & SETTING [ 📺 ] -1 <TEXT> RED (FLOF), ROTATE (NORMAL) [ +F ; HOLD 📺 ]			
GRN	.....	MENU <TV> PICTURE CONTROL [ 📺 ] -2 <TEXT> GREEN (FLOF), LIST (NORMAL) [ +F ; PICTURE CONTROL 📺 ]			
YEL	.....	MENU <TV> SOUND CONTROL [ 🎵 ] -3 <TEXT> YELLOW (FLOF), INITIAL (NORMAL) [ +F ; REVEAL 📺 ]			
CYN	.....	MENU <TV> TIMER MENU [ ⏰ ] -4 <TEXT> CYAN (FLOF) [ +F ; F-T-B 📺 ]			
1~9, 0	.....	TEN KEY			
+	.....	LEVEL PLUS (VOLUME, MENU) [ +F ; QUICK OPERATION]			
-	.....	LEVEL MINUS (VOLUME, MENU) [ +F ; QUICK OPERATION]			
▲	.....	UP (POSİ., CH.-Search, TEXT PAGE, MENU)			
▼	.....	DOWN (POSİ., CH.-Search, TEXT PAGE, MENU)			
🔄	.....	VIDEO INPUT/TV	⏮	.....	PREVIOUS
📺📺📺	.....	TEXT/MIX/TV	📺	.....	TEXT INDEX

**WARNING:** BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

## INSTALLATION AND SERVICE ADJUSTMENTS

### GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials. Plug the power cord into a convenient 220 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

### AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least one hour in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source.

### HIGH VOLTAGE CHECK

**CAUTION:** There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 27.5 kV.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 27.5 kV under any conditions.

### HEIGHT ADJUSTMENT

1. Receive the WG PHILIPS pattern, and set the contrast and colour to centre, and the brightness to centre.
2. Change the VERT POSITION SW (S301) so the round shape in the pattern is located in the centre of screen.
3. HEIGHT Control (R351) on MAIN Board changes the size of the picture or pattern, having an equal effect on the top and bottom. Make final adjustment to overscan the mask 2 cm at top and bottom.

### HORIZONTAL CENTRE ADJUSTMENT

1. Receive the WG PHILIPS pattern.
2. Set the contrast and colour to centre, and the brightness to centre.
3. Adjust Sub Address HPS so the pattern centre can be located at the screen centre.

### FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

### SIF DET ADJUSTMENT

1. Connect SIF generator to pin 2 of ICG30 through 0.01  $\mu$ F capacitor.
2. Connect the oscilloscope to pin 9 of ICG30.
3. Set up the SIF generator as described below.
  - Sound carrier frequency : 5.74 MHz
  - Modulation frequency : 1000 Hz
  - Frequency deviation :  $\pm 15$  kHz
  - Signal level : 80 dB $\mu$  (50 ohm load)
4. Adjust LG80 for the maximum response of 1000 Hz det-out on scope.
5. Connect SIF generator to pin 2 of ICG03 through 0.01  $\mu$ F capacitor.
6. Connect oscilloscope to pin 9 of ICG03.
7. Connect the wire between pin SQ of PG02 and +12V.
8. Set up the SIF generator as described below.
  - Sound carrier frequency : 6.5 MHz
  - Modulation frequency : 1 kHz
  - Frequency deviation :  $\pm 15$  kHz
  - Signal level : 80 dB $\mu$  (50 ohm load)
9. Adjust LG05 for the maximum response of 1 kHz det-out on scope.
10. Change the wire between pin SQ of PG02 and ground.
11. Change the sound carrier frequency to 5.5 MHz
12. Adjust CG55 for the maximum response of 1 kHz det-out on scope.

### BELL COIL (LM01) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the synchroscope to the terminal Pin 2 of LM01.
3. Adjust LM01 for the flat level of amplitude in each colour bar waveform on the scope. (See figure 1.)

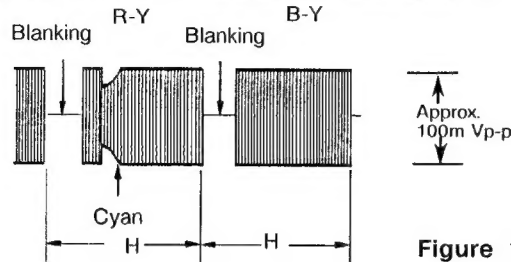


Figure 1.

### IDENT COIL (LM04) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the DC voltmeter (Digital Voltmeter) to the pin 23 of IC501.
3. Adjust LM04 for the maximum indication (approx. DC10V) on the meter.

### B-Y, R-Y DEMOD COIL (LM02, LM03) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Set the COLOUR, BRIGHTNESS and CONTRAST Controls free.
3. Connect the synchroscope to the pin 62 of IC501.
4. Adjust LM02 so that the white level in picture part reaches to the vertical retrace line. (See figure 2.)
5. Then change the connection of synchroscope from the pin 62 to the pin 60 of IC501.
6. Adjust LM03 so that the white level in picture part reaches to the vertical retrace line. (See figure 3.)

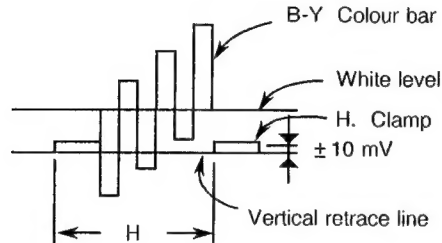


Figure 2.

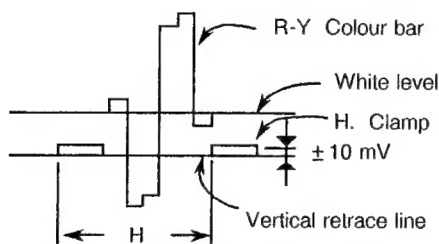


Figure 3.

### PAL MATRIX ADJUSTMENT



1. Tune in the colour programme of the Philips pattern.
2. Set the COLOUR Control to obtain the proper colour.
3. If the PAL MATRIX adjustment is incorrect, the Venetian Blind would appear in the colour bars area. This case needs the adjustment.
4. At the first, adjust DL PHASE ADJ. Coil (L551) to minimize the Venetian Blind.
5. Next adjust 1H-DL ADJ. VR (R551) to minimize the Blind.
6. If the Venetian Blind still remains, adjust 1H-DL PHASE ADJ. Coil (L551) to minimize the Blind

7. Repeat the item 5 and 6 procedures, adjust the R551 and L551 until the Blind does not appear.

### CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Set "SERVICE MODE" by RMT H.H.U. ( F + → and 1, 0, 4, 8 )
3. Turn the SCREEN Control (on T461) fully counter-clockwise.
4. By rotating the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) to the mid position.
5. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the center.
6. Set the "CUT OFF (No Vertical Deflection) MODE" by RMT H.H.U. ( F + 2 key)
7. Rotate the SCREEN Control gradually clockwise until the first line appears slightly on the screen. Set the SCREEN Control to this position.
8. Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE). The lines may look like white if the CUT OFF Controls are adjusted properly.
9. Release the "CUT OFF MODE" by RMT H.H.U. ( F + 2 key)
10. Set the CONTRAST and COLOUR Controls to minimum, and BRIGHTNESS Control to the maximum.
11. Adjust the BLUE and GREEN DRIVE Controls (R252/R253) to obtain proper white-balanced picture in high light areas.
12. Set the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.
13. Exit from the "SERVICE MODE" by turning the power ON/OFF with RMT H.H.U.

### SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme.
2. Set the "SERVICE MODE" by RMT H.H.U.
3. Set the CONTRAST Control to the maximum and BRIGHT Control to the center.
4. Set the COLOUR Control to the minimum.
5. Select the "SUB" symbol (F +  (Item UP), F +  (Item DN)) and adjust the level to the center by LEVEL key of RMT H.H.U. and leave the TV for five minutes in this state.
6. Watching the picture well, adjust the SUB-BRIGHT Control in the position (same method as in step No.5) where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
7. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
8. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT Control again for the acceptable picture.
9. Exit from the "SERVICE MODE" by turning the power ON/OFF with the RMT H.H.U.

## ADJUSTMENT METHOD FOR SERVICING

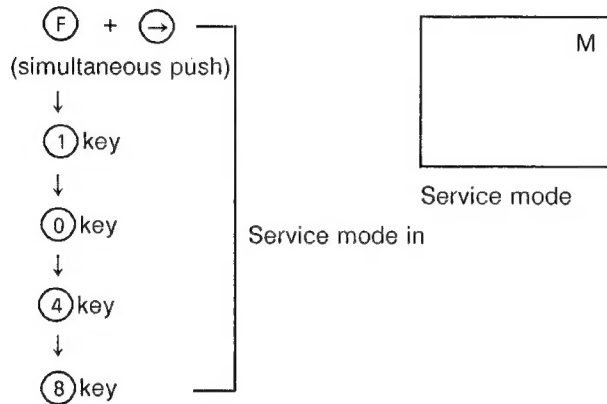
### 1. OUTLINE

Since each IC used is of I<sup>2</sup>C bus control type, readjustment of the TVs also needs adjustment through I<sup>2</sup>C bus control.

In the service mode, sub-bright, deflection system sub-adjustments, picture system sub-adjustments can be made easily with user remote control unit.

### 2. SERVICE MODE OPERATION

#### 2-1. How to Enter the Service Mode



#### 2-2. How to Exit from the Service Mode

Exit the service mode by turning the power on/off with the remote control.

### 3. ADJUSTMENT IN THE SERVICE MODE

#### 3-1. Service Mode Level Adjustments

- (1) Push (F) + (■) key (simultaneous push) (item UP) or (F) + (♪) key (simultaneous push) (item DN) to select item to be adjusted.
- (2) Adjust with the level UP/DN (VOL UP/DN key) key.

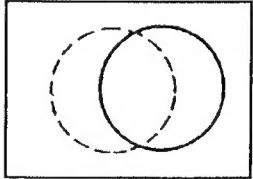
#### 3-2. Other Service Mode Adjustments

(F) + (2) key (simultaneous push) cut off: (NO VERTICAL DEFLECTION) ON/OFF

### 4. SERVICE MODE LEVEL ADJUSTMENT ITEM LIST

Symbol	RAM No.	Controlled IC	Item
HPS	30	MULTI-COL (TA8783N)	SUB H-POSITION

### 5. SUB DATA ADDITIONAL DESCRIPTION

RAM No.	Symbol	Description
16	SUB	Sub brightness setting
23	HPS	H screen position correction. 

# 6. ROM DATA LIST FOR IIC BUS CONTROL

(Reference Value)

RAM No.	Symbol	Comment	Data
16	SUB	SUB BRIGHTNESS	* 31
17	SBM	BRIGHTNESS ADJUST. WIDTH	28
18	SCN	SUB CONTRAST	32
19	SCM	CONTRAST MINIMUM	10
20	SCL	SUB COLOUR	34
21	SC3	SUB COLOUR 3.58	31
22	STI	SUB TINT	44
23	HPS	H. POSITION	* 40
24	SS4	SHARPNESS CENTER 4.43	20
25	SS3	SHARPNESS CENTER 3.58	50
26	IGR	STEREO SEPARATION	47
27	FLT	TONE FILTER	—
28	RFA	RF AGC	—
29	LVE	VIDEO OUTPUT LEVEL	—
30	M00	MODE 0	34
31	M01	MODE 1	09
32	M02	MODE 2	03

\* Mark items should be adjusted.

## PICTURE I-F TRAP ALIGNMENT

GENERAL .....	Refer to figure 4 for the equipment connection.
PRELIMINARY STEPS .....	1. Turn the power switch of TV set off. 2. Supply +12 volts to the PIF Board. 3. Turn RF AGC Control (R151) fully clockwise.
SWEEP/MARKER GENERATOR.....	Connect to pin PL of P102 on the PIF Board as shown in figure 4. Set the signal level to 80dB $\mu$ V.
OSCILLOSCOPE.....	Connect through the detector (See figure 6.) to the emitter of Q103.

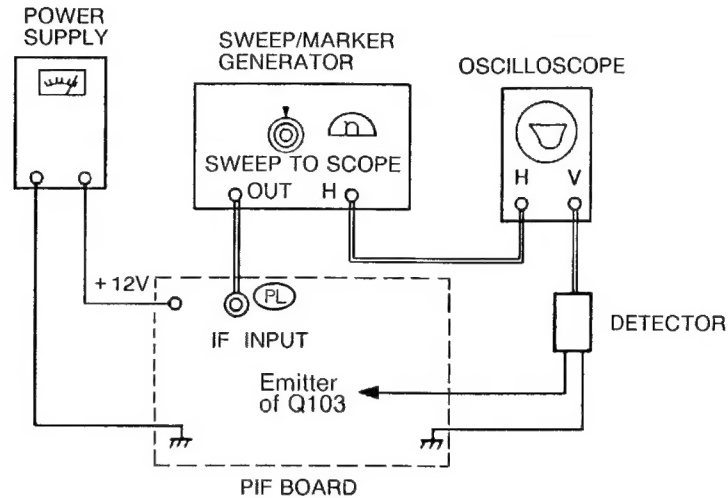


Figure 4.

STEP	SWEEP/MARKER GENERATOR	ADJUST	PROCEDURE
<b>TRAP ALIGNMENT</b> Control the sweep output for easy alignment. Set the IF makers for 40.4MHz and 31.9MHz.			
Trap coil TN01	40.4MHz Marker "ON"	TN01	Short the pin PL of P101 to ground. Adjust TN01 so the 40.4MHz marker point is placed at bottom of response. (See figure 5.)
Trap coil TN02	31.9MHz Marker "ON"	TN02	Short the pin PL of P101 to ground, and adjust TN02 so the 31.9MHz marker point is placed at bottom of response. (See figure 5.)



Figure 5. Trap Response

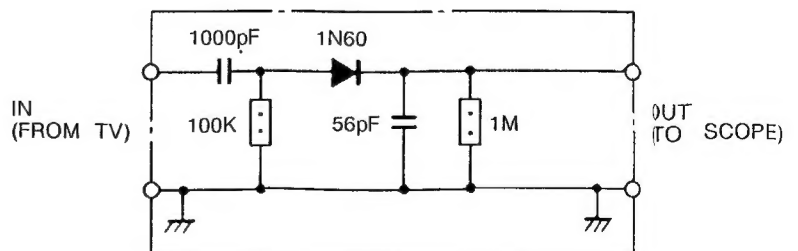


Figure 6. Detector Diagram

## PICTURE I-F SWEEP ALIGNMENT

GENERAL .....	Refer to figure 7 for test equipment connection.
PRELIMINARY STEPS .....	1. Supply +12 volts to the PIF Board. 2. Supply dc 4~5V to pin 4 of IC101. 3. Connect pin 16 of IC101 to ground through capacitor 10 $\mu$ F.
SWEEP/MARKER GENERATOR.....	Connect to pin PL of PIF Board as shown in figure 7. Set to 30 ~ 40 MHz sweep with signal level of 75 ~ 85 dB $\mu$ .
OSCILLOSCOPE .....	Connect through the detector to pin 19 of IC101 on the IF Board.

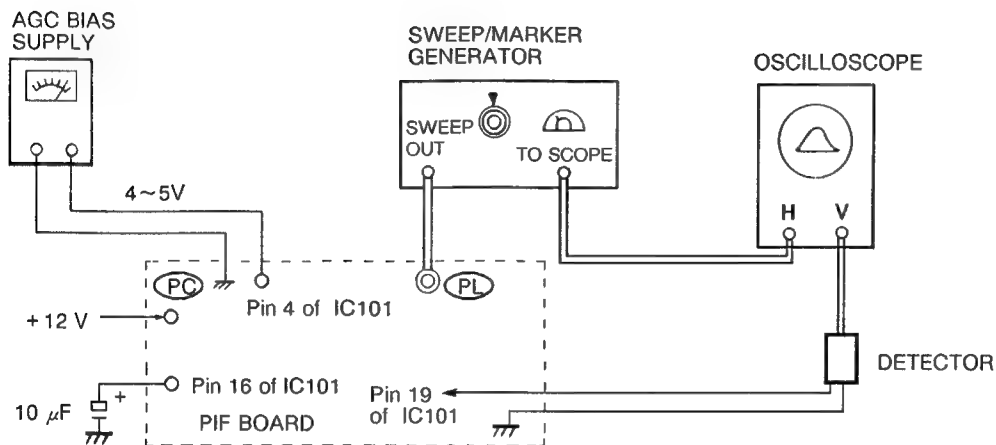
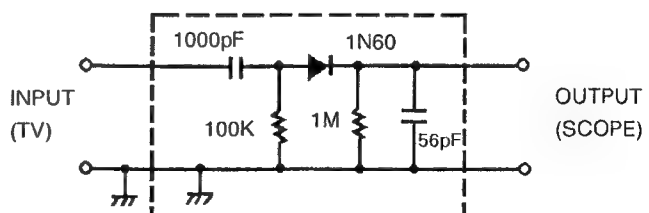


Figure 7. Picture IF Sweep Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
38.9MHz VCO Coil	38.9 MHz Marker "ON"	L151	<ul style="list-style-type: none"> <li>Adjust L151 so that the marker (38.9 MHz) on the response can get zero beat with free-run frequency. (See figure 8.)</li> <li>Remove the capacitor 10<math>\mu</math>F on pin 16 of IC101.</li> </ul>
After completing the above step, disconnect the equipment and re-solder the solder links, and adjust the RF AGC control (R151) following RF AGC ADJUSTMENTS.			



Figure 8. Magnified Response Curve



Detector Diagram

## AFC ALIGNMENT

GENERAL ..... Refer to figure 9 for test equipment connection.  
 PRELIMINARY STEPS ..... 1. Supply +12 volts to the PIF Board.  
 DVM ..... Connect to the pin PF of P101 on PIF Board and ground.

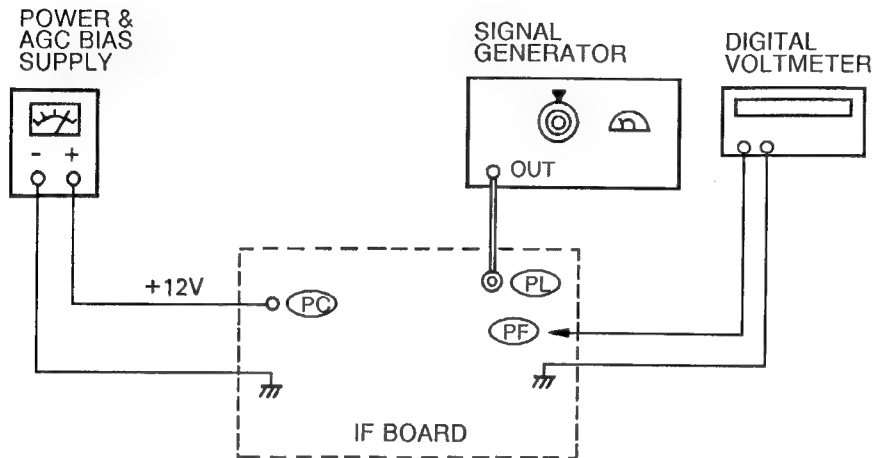
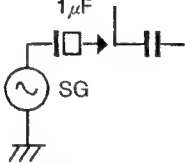


Figure 9. AFC Alignment

STEP	SIGNAL GENERATOR	ADJUST	REMARKS
1. AFC Balance (R153)	NO SIGNAL	R153	<ul style="list-style-type: none"> <li>Connect pin 4 of IC101 to ground.</li> <li>Connect DVM to pin PF of P101 on PIF Board.</li> <li>Adjust R153 for 4.5 volts reading on meter.</li> </ul>
2. AFC Coil (L152)	38.9 MHz CARRIER WAVE (Level : 75 to 85 dB $\mu$ )	L153	<ul style="list-style-type: none"> <li>Remove the short of pin 4 of IC101.</li> <li>Apply +12 V to pin PC of P101.</li> <li>Connect IF carrier wave to the pin PF of P101.</li> <li>Connect DVM to pin PF of P102.</li> <li>Adjust L152 for 4.3 volts on the meter.</li> </ul>

## SIF & MPX (IGR) ALIGNMENT

■ Supply +12V to pin SN of PG02 on IGR Board.

STEP	ADJUSTING PARTS	INPUT TERMINAL	OUTPUT TERMINAL	TEST SIGNAL	PROCEDURE
1.	54.7 kHz PILOT ADJ. (LG01)	CG45 	Pin 5 (ICG01)	Pilot Signal Input level: 100mVp-p f = 54.69 kHz	1. Connect the signal to CG45. 2. Connect oscilloscope to pin 5 of ICG01. 3. Adjust LG01 for the maximum amplitude of 54.69 kHz element.
2.	STEREO SEPARATION (RG50)	Aerial	PIN SA (PG01)	ON AIR SIGNAL S1: fm = 1 kHz Δf = ± 15 kHz S2: fm = 1 kHz Δf = ± 30 kHz LEFT CH.: No modulation Input level: 100dBμ	1. Receive ON-AIR stereo signal. 2. Connect oscilloscope to pin SA of PG02. 3. Adjust RG50 for the minimum amplitude of 1 kHz element.

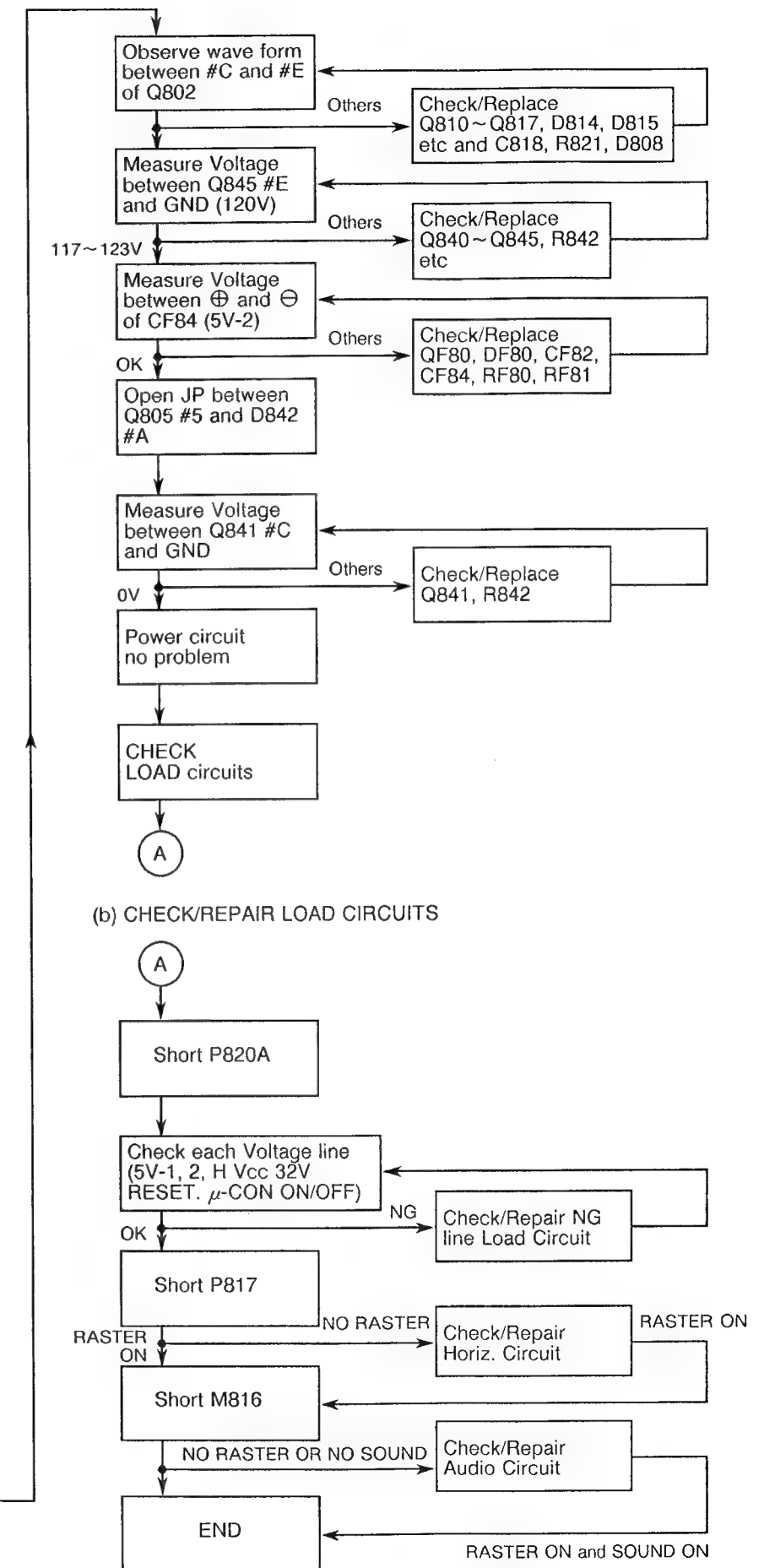
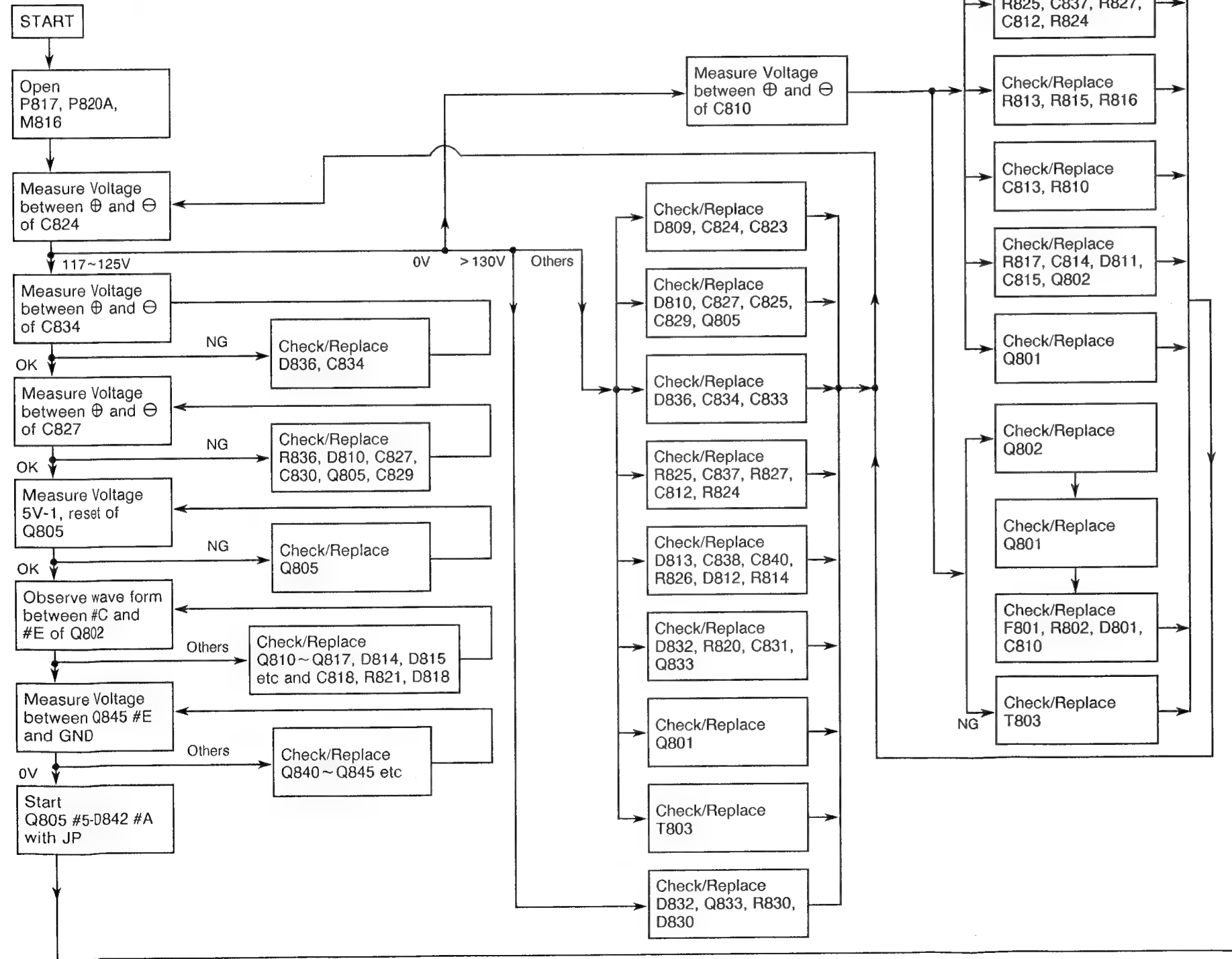
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## TROUBLESHOOTING CHARTS

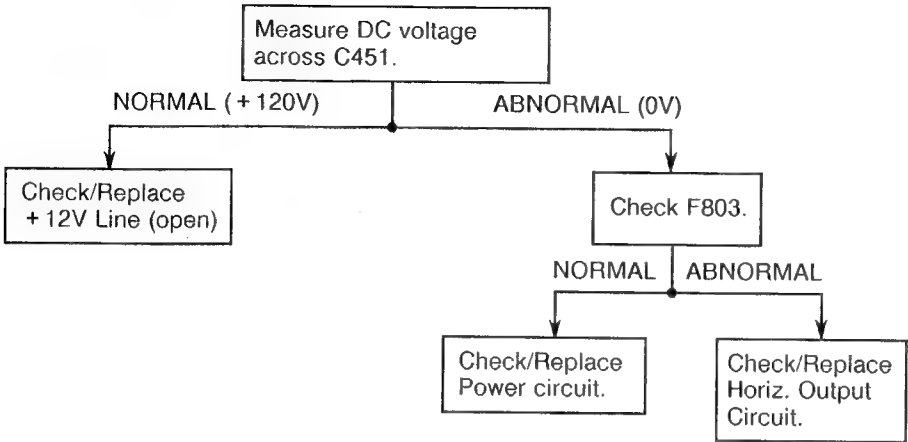
The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.  
In order to utilize the charts (fault trees), firstly establish the complaint, i.e. – No Raster, No Sound.  
Locate the chart applicable and then progress through the various alternatives until a final block indicates the offending components or stage.

### 1. NO RASTER AND NO SOUND

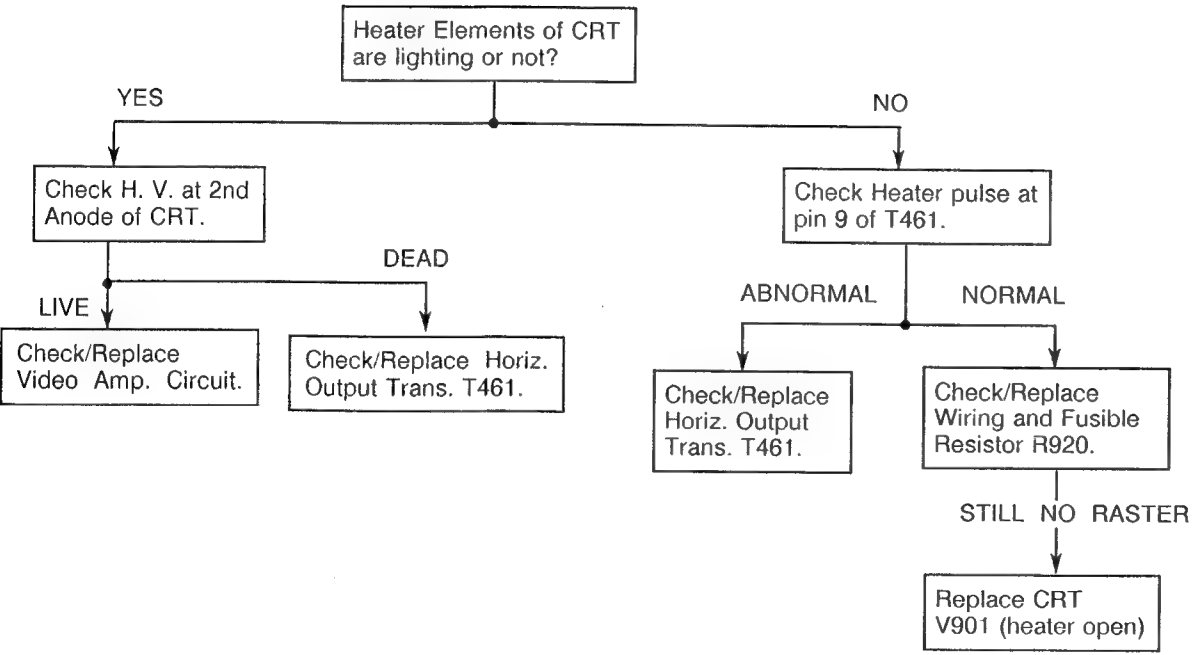
#### (a) CHECK/REPAIR POWER CIRCUIT



2. NO RASTER (NOISE OR WEAK SOUND)

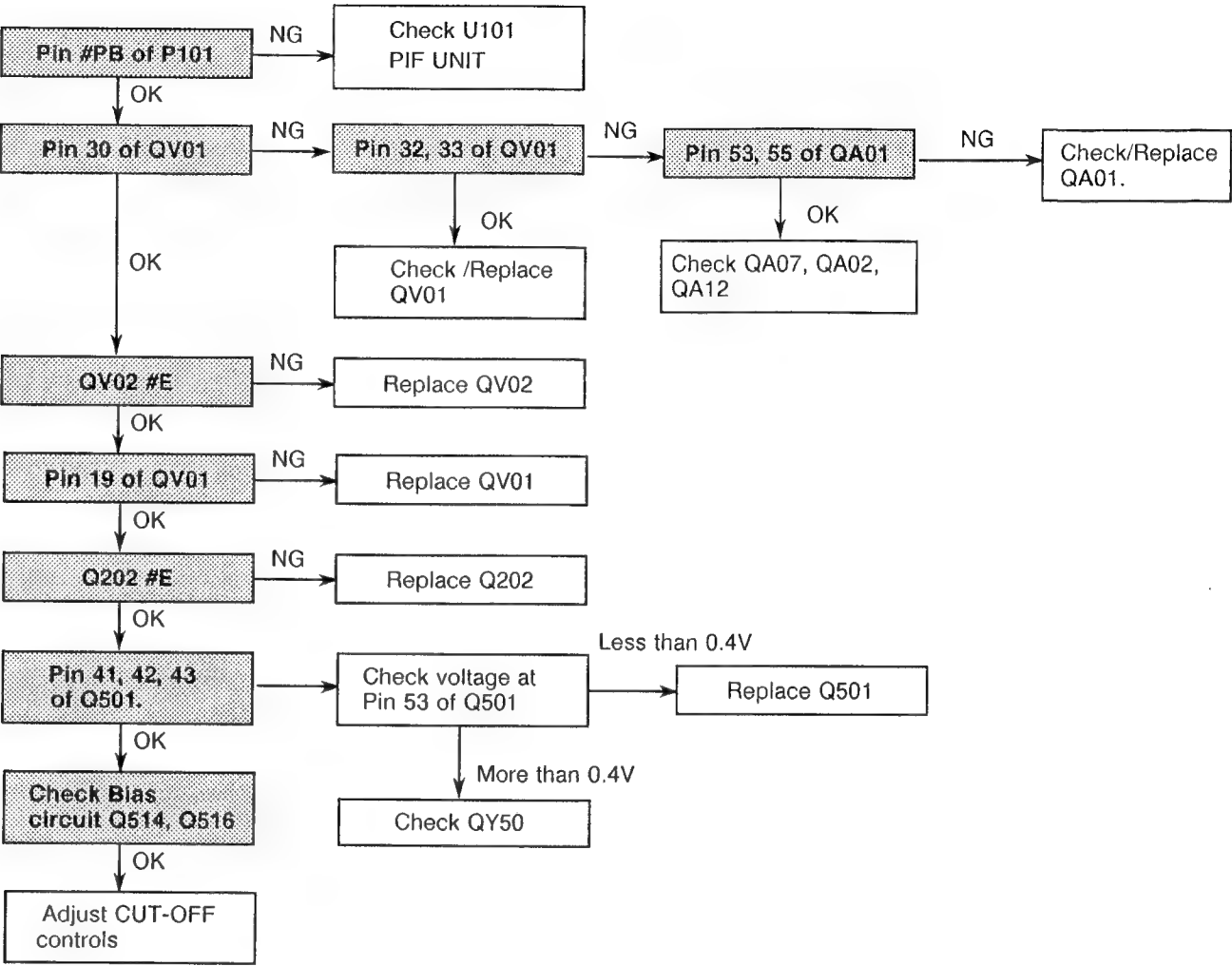


3. NO RASTER (SOUND OK)



4. NO PICTURE

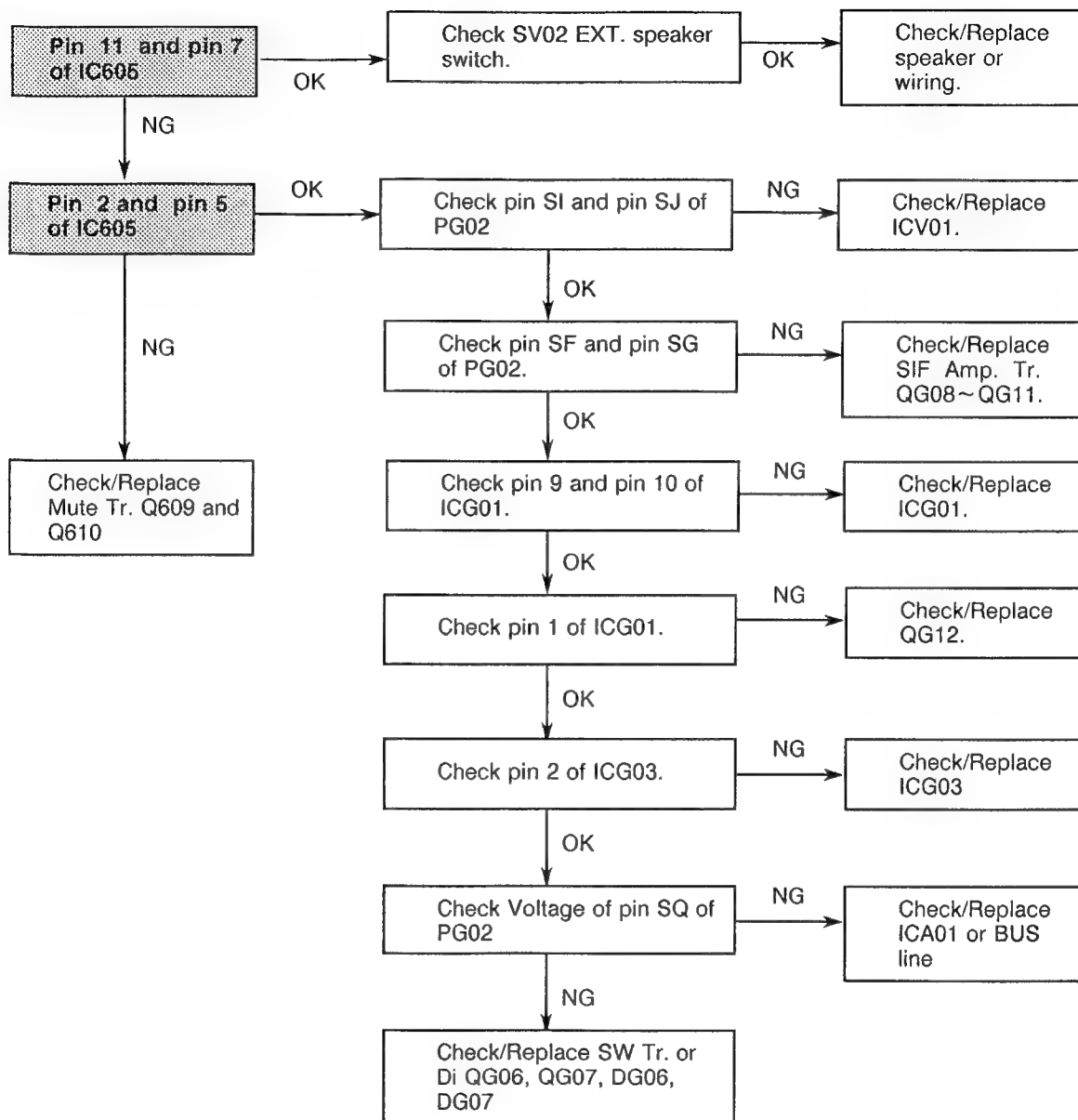
Check video signal waveform for shaded area below.



## 5. NO SOUND

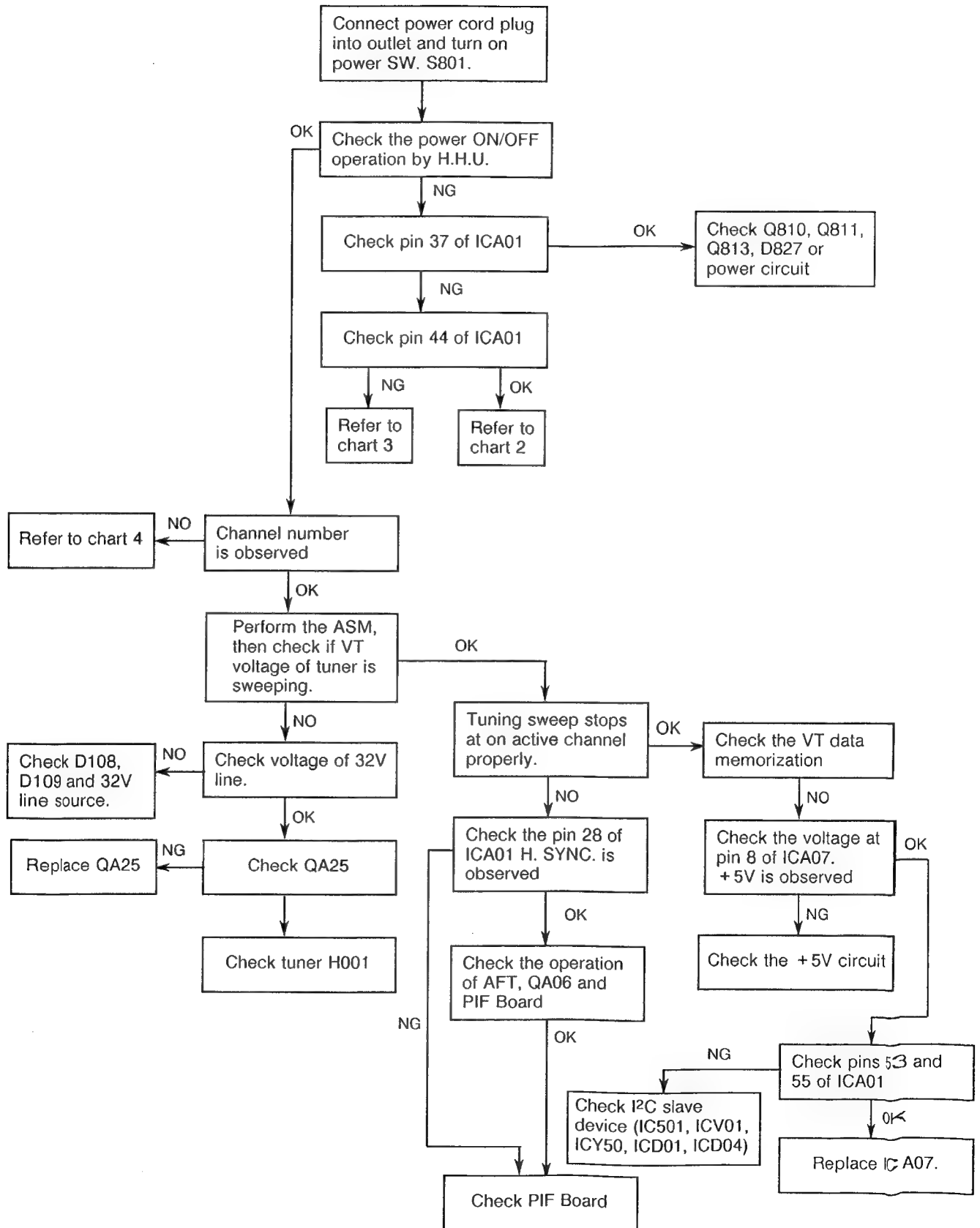
**Note:** Check the sound signal waveform for shaded area below.

**CONDITION : VOLUME MAX.**



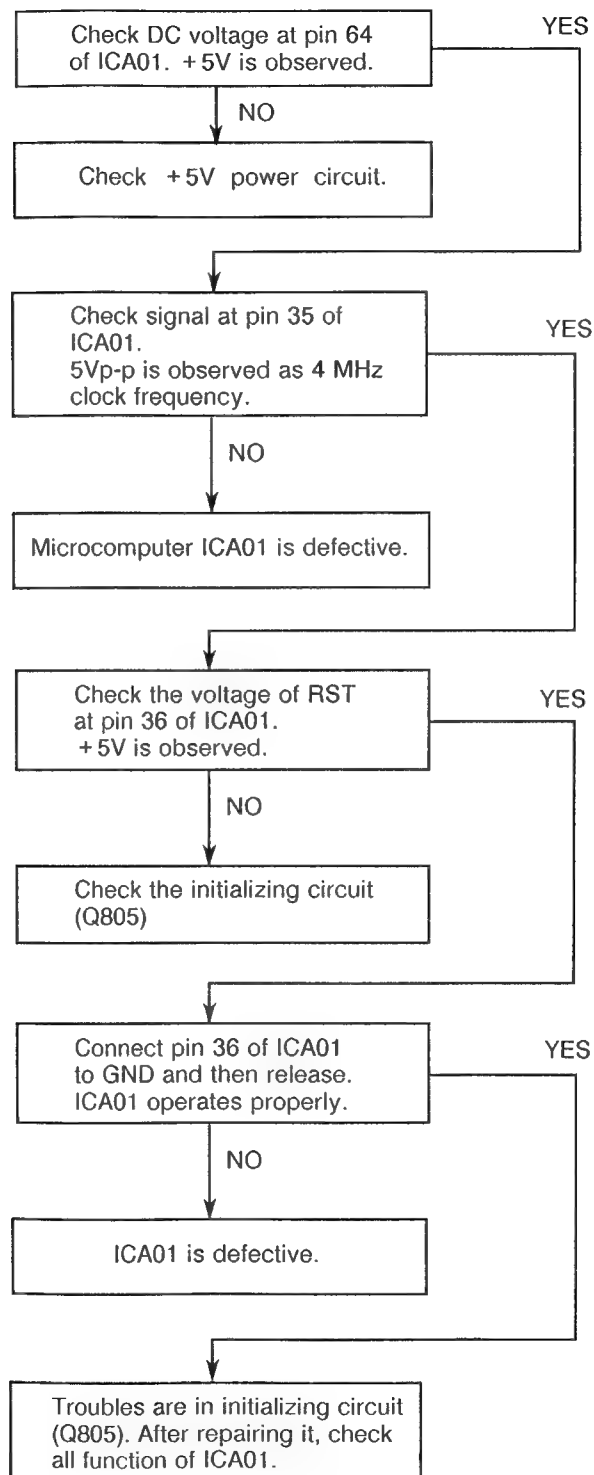
## 6. CHANNEL SELECTOR TROUBLE

[CHART 1]



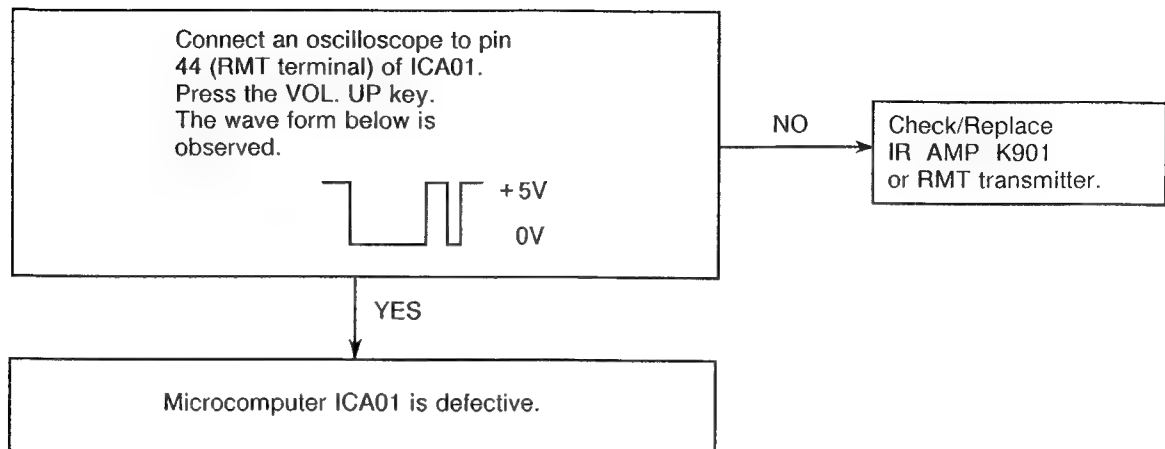
**[CHART 2] Microcomputer (ICA01) Operation Check**

**Note:** Before checking Microcomputer, check that control buttons and their connection work properly.

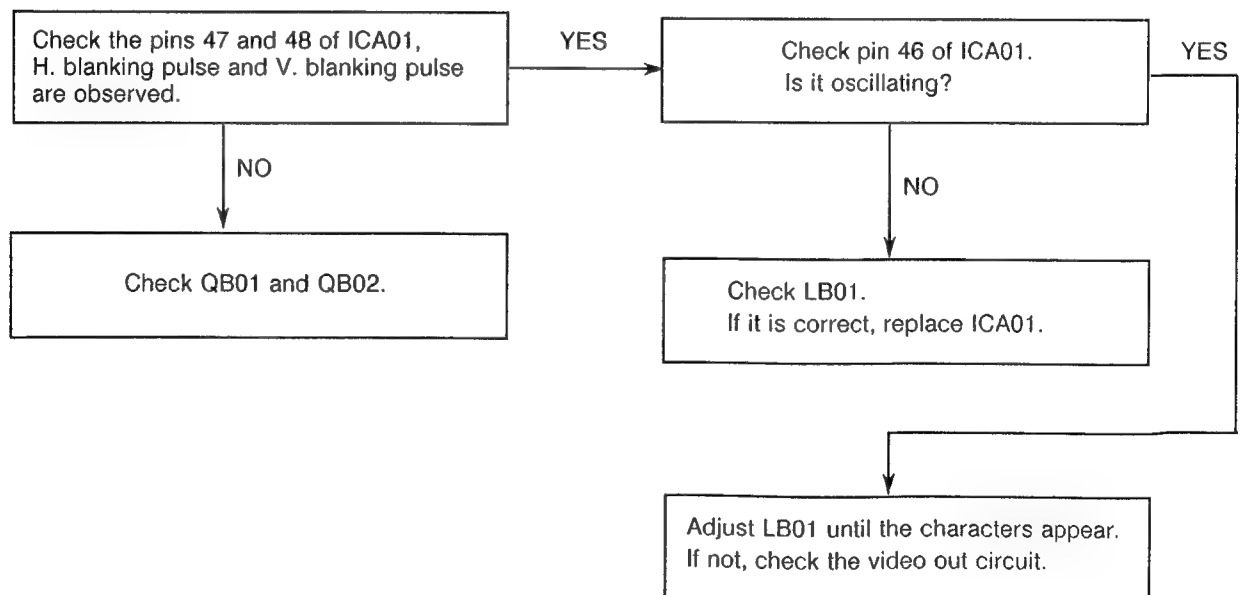


### [CHART 3] Remote Control Operation Check

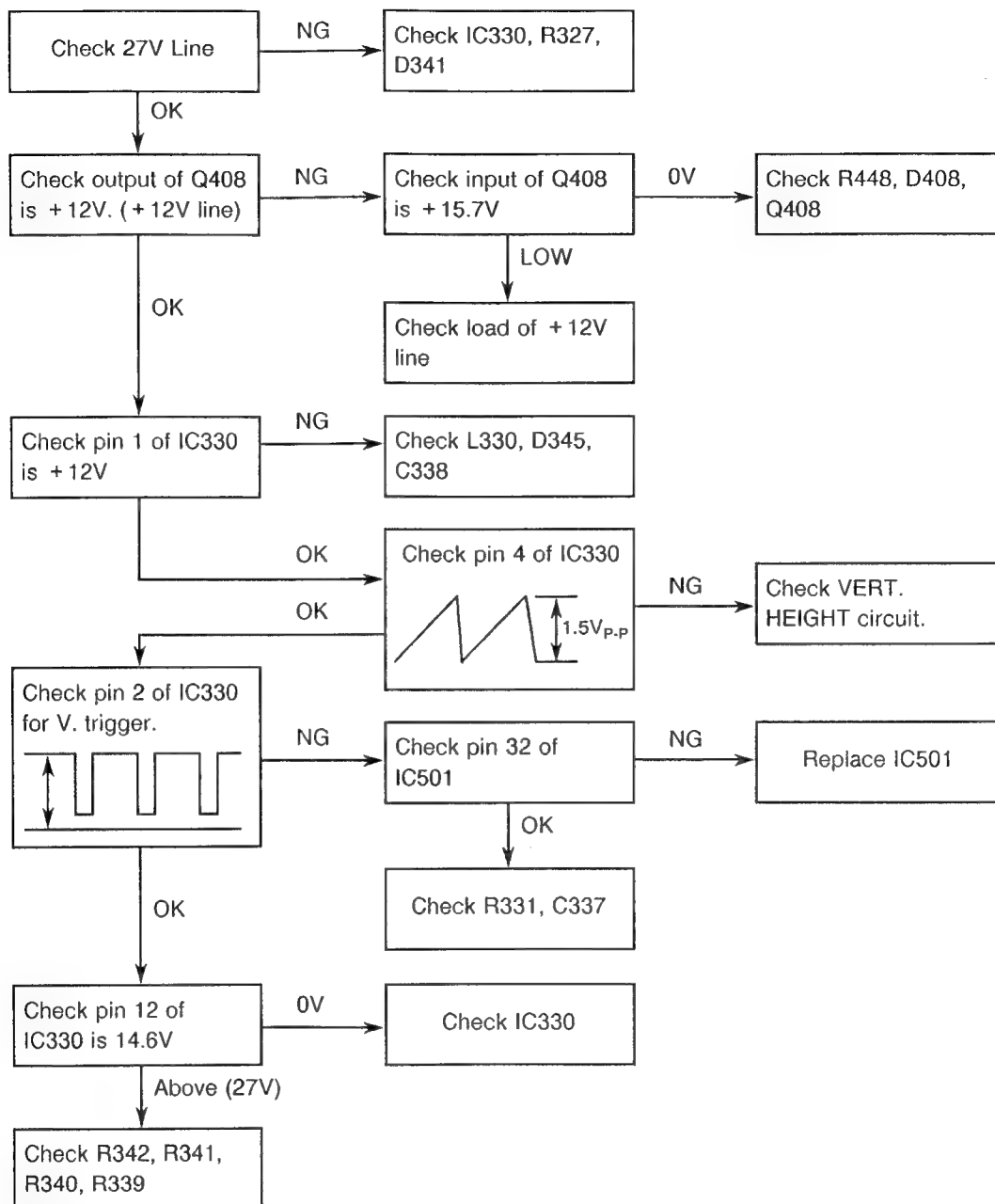
**Note :** Before checking RMT operation, check that key operation on TV set is proper.



### [CHART 4] On Screen Display Operation Check



## 7. NO VERT. SCAN (ONE HORIZ. LINE RASTER)



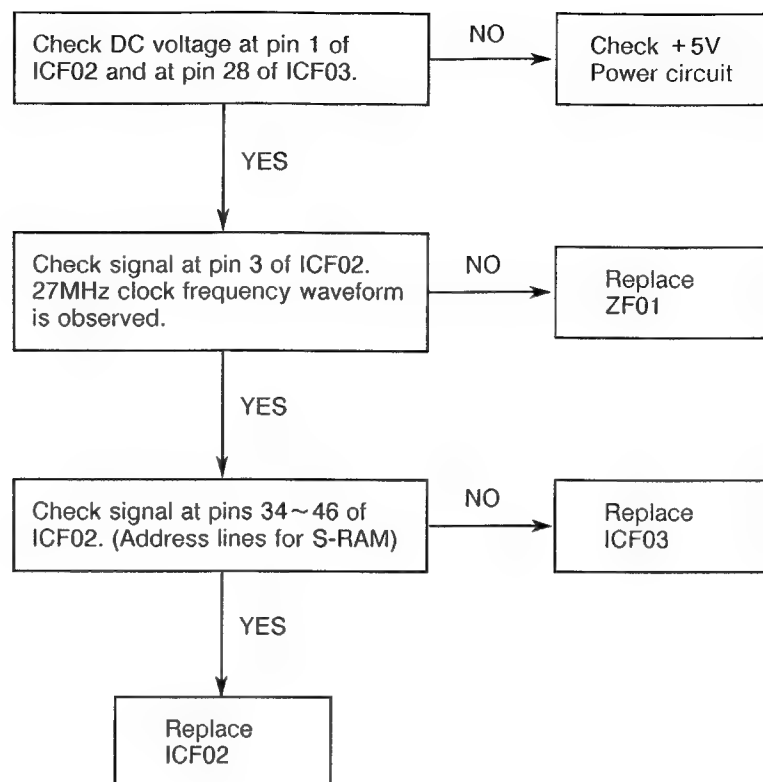
## 8. OUT OF VERT. SYNC. AND HORIZ. SYNC.

Check/Replace Sync Circuit (pin 33 of IC501) and IC501.

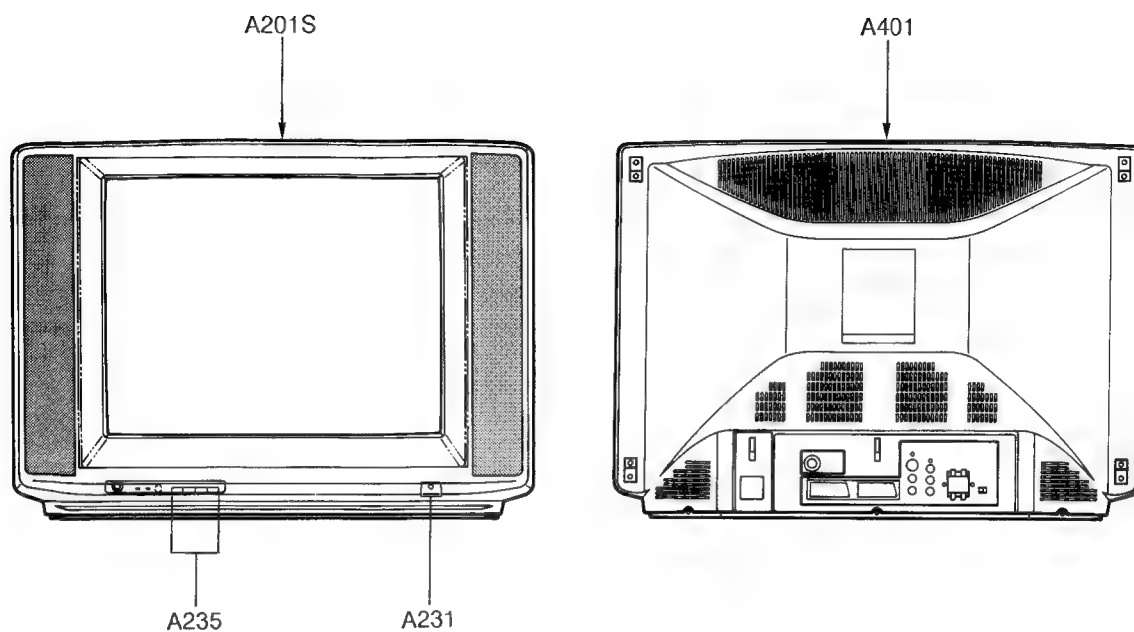
## 9. OUT OF HORIZ. SYNC.

Check/Replace IC501.

## 10. TELETEXT OPERATION TROUBLE



## CABINET REPLACEMENT PARTS LIST



Location No.	Part No.	Description
A201S	23418975	Front Cover
A231	23443553	Button, POWER
A235	23443552	Button, UP-DOWN
A401	23424156	Back Cover
A411	23567859	Label, Model No.
A412	23995762	Label, TUB(On B/C)
A701	23523564	Carton Box
A702	23934005	Packing, Bottom
A703	23934899	Packing, Top
A710	23567858	Label
B202	23443043	Knob, Sub
Y101	23561116	Owner's Manual

## CHASSIS REPLACEMENT PARTS LIST

**WARNING:** BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

**CAUTION:** The international hazard symbols in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

**NOTICE:** The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.

### ABBREVIATIONS:

Capacitors.....	CD : Ceramic Disk	PF : Plastic Film	EL : Electrolytic
Resistors.....	CF : Carbon Film	CC : Carbon Composition	MF : Metal Film
	OMF : Oxide Metal Film	VR : Variable Resistor	FR : Fusible Resistor

(All CD and PF capacitors are  $\pm 5\%$ , 50V and all resistors,  $\pm 5\%$ , 1/6W unless otherwise noted.)

Location No.	Part No.	Description
<b>CAPACITORS</b>		
C101	24815102	Chip, 1000pF, $\pm 10\%$
C102	24815102	Chip, 1000pF, $\pm 10\%$
C104	24206478	EL, 0.47 $\mu$ F, 50V
C105	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C106	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C107	24781221	Chip, 220pF
C108	24206478	EL, 0.47 $\mu$ F, 50V
C109	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C110	24203470	EL, 47 $\mu$ F, $\pm 20\%$ , 16V
C111	24815102	Chip, 1000pF, $\pm 10\%$
C112	24815102	Chip, 1000pF, $\pm 10\%$
C114	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C116	24206010	EL, 1 $\mu$ F, 50V
C117	24778181	Chip, 180pF
C118	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C119	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C120	24794331	EL, 330 $\mu$ F, 16V
C121	24794221	EL, 220 $\mu$ F, 16V
C122	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C123	24815102	Chip, 1000pF, $\pm 10\%$
C124	24203470	EL, 47 $\mu$ F, $\pm 20\%$ , 16V
C125	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C170	24781120	Chip, 12pF
C171	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C180	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C181	24794471	EL, 470 $\mu$ F, $\pm 20\%$ , 16V
C182	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C183	24206229	EL, 2.2 $\mu$ F, 50V
C184	24206229	EL, 2.2 $\mu$ F, 50V
C185	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C186	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C187	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C188	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C189	24797229	EL, 2.2 $\mu$ F, $\pm 20\%$ , 50V
C190	24232103	CD, 0.01 $\mu$ F, +80%, -20%
C191	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C201	24085981	EL, 10 $\mu$ F, $\pm 20\%$ , 16V
C202	24795101	EL, 100 $\mu$ F, 25V
C203	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C204	24206220	EL, 22 $\mu$ F, 50V

Location No.	Part No.	Description
C205	24797478	EL, 0.47 $\mu$ F, $\pm 20\%$ , 50V
C208	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C209	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C210	24473220	CD, 22pF
C212	24232103	CD, 0.01 $\mu$ F, +80%, -20%
C213	24474103	CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V
C220	24473300	CD, 30pF
C240	24797478	EL, 0.47 $\mu$ F, $\pm 20\%$ , 50V
C301	24797229	EL, 2.2 $\mu$ F, $\pm 20\%$ , 50V
C302	24212152	CD, 1500pF, $\pm 10\%$
C314	24796102	EL, 1000 $\mu$ F, 35V
C315	24214221	CD, 220pF, $\pm 10\%$ , 500V
C330	24590103	PF, 0.01 $\mu$ F
C331	24617915	EL, 1 $\mu$ F, $\pm 10\%$ , 50V
C332	24796221	EL, 220 $\mu$ F, $\pm 20\%$ , 35V
C333	24796101	EL, 100 $\mu$ F, 35V
C334	24082057	PF, 0.22 $\mu$ F, 100V
C335	24795332	EL, 3300 $\mu$ F, 25V
C336	24617915	EL, 1 $\mu$ F, $\pm 10\%$ , 50V
C337	24474102	CD, 1000pF, $\pm 10\%$
C338	24794470	EL, 47 $\mu$ F, $\pm 20\%$ , 16V
C339	24590104	PF, 0.1 $\mu$ F
C340	24435100	CD, 10pF
C402	24353241	CD, 240pF
C403	24797339	EL, 3.3 $\mu$ F, $\pm 20\%$ , 50V
C405	24590203	PF, 0.02 $\mu$ F
C406	24590153	PF, 0.015 $\mu$ F
C407	24590243	PF, 0.024 $\mu$ F
C408	24797100	EL, 10 $\mu$ F, $\pm 20\%$ , 50V
C409	24232103	CD, 0.01 $\mu$ F, +80%, -20%
C410	24693272	PF, 2700pF, 100V
C414	24212221	CD, 220pF, $\pm 10\%$
C416	24214271	CD, 270pF, $\pm 10\%$ , 500V
△ C440	24095889	PF, 9100pF, $\pm 3\%$ , 1600V
C441	24214221	CD, 220pF, $\pm 10\%$ , 500V
C443	24214221	CD, 220pF, $\pm 10\%$ , 500V
C444	24092339	CD, 330pF, $\pm 10\%$ , 2kV
C445	24095903	PF, 0.056 $\mu$ F, $\pm 10\%$ , 250V
C447	24700479	EL, 4.7 $\mu$ F, $\pm 20\%$ , 50V
C448	24667102	EL, 1000 $\mu$ F, $\pm 20\%$ , 25V
C449	24666471	EL, 470 $\mu$ F, $\pm 20\%$ , 16V

Location No.	Part No.	Description
C451	24640908	EL, 33 $\mu$ F, $\pm$ 20%, 160V
△ C463	24212222	CD, 2200pF, $\pm$ 10%
C465	24095759	PF, 0.39 $\mu$ F, 200V
C501	24797220	EL, 22 $\mu$ F, $\pm$ 20%, 50V
C504	24474181	CD, 180pF, $\pm$ 10%
C505	24590273	PF, 0.027 $\mu$ F
C507	24590103	PF, 0.01 $\mu$ F
C508	24085944	EL, 2.2 $\mu$ F, $\pm$ 20%, 50V, Non-Polar
C510	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
C511	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
C513	24232103	CD, 0.01 $\mu$ F, +80%, -20%
C514	24474181	CD, 180pF, $\pm$ 10%
C515	24797220	EL, 22 $\mu$ F, $\pm$ 20%, 50V
C516	24590104	PF, 0.1 $\mu$ F
C517	24590104	PF, 0.1 $\mu$ F
C518	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
C519	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
C520	24797478	EL, 0.47 $\mu$ F, $\pm$ 20%, 50V
C521	24538474	PF, 0.47 $\mu$ F
C522	24538474	PF, 0.47 $\mu$ F
C523	24538474	PF, 0.47 $\mu$ F
C524	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
C525	24436270	CD, 27pF
C526	24436270	CD, 27pF
C527	24436270	CD, 27pF
C528	24474102	CD, 1000pF, $\pm$ 10%
C529	24473150	CD, 15pF
C530	24796220	EL, 22 $\mu$ F, $\pm$ 20%, 35V
C531	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
C532	24436101	CD, 100pF
C533	24436101	CD, 100pF
C534	24436101	CD, 100pF
C535	24636100	EL, 10 $\mu$ F, 50V
C536	24636478	EL, 0.47 $\mu$ F, 50V
C537	24794101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
C538	24353200	CD, 20pF
C539	24353330	CD, 33pF
C540	24436221	CD, 220pF
C541	24436221	CD, 220pF
C542	24436221	CD, 220pF
C543	24794220	EL, 22 $\mu$ F, $\pm$ 20%, 16V
C603	24287103	Chip, 0.01 $\mu$ F, +80%, -20%
C606	24203330	EL, 33 $\mu$ F, $\pm$ 20%, 16V
C607	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
C620	24795102	EL, 1000 $\mu$ F, $\pm$ 20%, 25V
C621	24795102	EL, 1000 $\mu$ F, $\pm$ 20%, 25V
C622	24795101	EL, 100 $\mu$ F, 25V
C623	24538184	PF, 0.18 $\mu$ F
C624	24590104	PF, 0.1 $\mu$ F
C625	24538184	PF, 0.18 $\mu$ F
C633	24590562	PF, 5600pF
C635	24794101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
C636	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
C638	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
C639	24795101	EL, 100 $\mu$ F, 25V
C640	24590562	PF, 5600pF
C642	24794101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
C643	24590104	PF, 0.1 $\mu$ F
C644	24797471	EL, 470 $\mu$ F, $\pm$ 20%, 50V
C645	24590104	PF, 0.1 $\mu$ F
C646	24436101	CD, 100pF
C647	24436101	CD, 100pF
△ C801	24098999	PF, 0.1 $\mu$ F, $\pm$ 20%, AC250V

Location No.	Part No.	Description
△ C802	24098999	PF, 0.1 $\mu$ F, $\pm$ 20%, AC250V
C803	24092281	CD, 4700pF, $\pm$ 20%, AC250V
C804	24092281	CD, 4700pF, $\pm$ 20%, AC250V
C805	24092281	CD, 4700pF, $\pm$ 20%, AC250V
C806	24092281	CD, 4700pF, $\pm$ 20%, AC250V
C810	24086856	EL, 270 $\mu$ F, $\pm$ 20%, 400V
C811	24436101	CD, 100pF
C812	24436561	CD, 560pF
C813	24590682	PF, 6800pF
C814	24630747	EL, 22 $\mu$ F, $\pm$ 20%, 25V
C815	24212102	CD, 1000pF, $\pm$ 10%
C816	24092339	CD, 330pF, $\pm$ 10%, 2kV
C818	24095931	PF, 2200pF, 1600V
C820	24797101	EL, 100 $\mu$ F, $\pm$ 20%, 50V
C821	24436331	CD, 330pF
C823	24092336	CD, 180pF, $\pm$ 10%, 2kV
C824	24086953	EL, 220 $\mu$ F, $\pm$ 20%, 160V
C825	24232103	CD, 0.01 $\mu$ F, +80%, -20%
C827	24795102	EL, 1000 $\mu$ F, $\pm$ 20%, 25V
C829	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
C830	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
C831	24709479	EL, 4.7 $\mu$ F, $\pm$ 20%, 200V
C833	24214331	CD, 330pF, $\pm$ 10%, 500V
C834	24797222	EL, 2200 $\mu$ F, $\pm$ 20%, 50V
C835	24436101	CD, 100pF
C837	24590103	PF, 0.01 $\mu$ F
C838	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
C839	24538474	PF, 0.47 $\mu$ F
C840	24538474	PF, 0.47 $\mu$ F
C845	24666101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
C861	24762471	EL, 470 $\mu$ F, $\pm$ 20%, 10V
C881	24094656	CD, 2200pF, $\pm$ 20%, AC400V
C882	24094656	CD, 2200pF, $\pm$ 20%, AC400V
C885	24598102	PF, 1000pF
C886	24436101	CD, 100pF
C887	24794470	EL, 47 $\mu$ F, $\pm$ 20%, 16V
C901	24700479	EL, 4.7 $\mu$ F, $\pm$ 20%, 250V
C902	24095923	PF, 4700pF, 1600V
CA11	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CA12	24794102	EL, 1000 $\mu$ F, 16V
CA13	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CA14	24232103	CD, 0.01 $\mu$ F, +80%, -20%
CA15	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CA16	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CA29	24232103	CD, 0.01 $\mu$ F, +80%, -20%
CA31	24436300	CD, 30pF
CA32	24436300	CD, 30pF
CA33	24474102	CD, 1000pF, $\pm$ 10%
CA36	24590104	PF, 0.1 $\mu$ F
CA39	24474391	CD, 390pF, $\pm$ 10%
CA40	24474221	CD, 220pF, $\pm$ 10%
CA41	24590104	PF, 0.1 $\mu$ F
CA42	24590563	PF, 0.056 $\mu$ F
CA43	24590563	PF, 0.056 $\mu$ F
CA70	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CA71	24212102	CD, 1000pF, $\pm$ 10%
CA72	24212472	CD, 4700pF, $\pm$ 10%
CA75	24436561	CD, 560pF
CA76	24794330	EL, 33 $\mu$ F, $\pm$ 20%, 16V
CA77	24232103	CD, 0.01 $\mu$ F, +80%, -20%
CA78	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CA98	24797229	EL, 2.2 $\mu$ F, $\pm$ 20%, 50V
CA99	24590104	PF, 0.1 $\mu$ F
CB01	24212101	CD, 100pF, $\pm$ 10%

Location No.	Part No.	Description
CF01	24232103	CD, 0.01 $\mu$ F, +80%, -20%
CF02	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
CF03	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CF04	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
CF05	24353220	CD, 22pF
CF06	24353220	CD, 22pF
CF07	24232103	CD, 0.01 $\mu$ F, +80%, -20%
CF08	24590104	PF, 0.1 $\mu$ F
CF09	24085944	EL, 2.2 $\mu$ F, $\pm$ 20%, 50V, Non-Polar
CF10	24206100	EL, 10 $\mu$ F, 50V
CF11	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CF15	24794470	EL, 47 $\mu$ F, $\pm$ 20%, 16V
CF16	24353220	CD, 22pF
CF17	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
CF18	24590103	PF, 0.01 $\mu$ F
CF19	24794101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
CF20	24436220	CD, 22pF
CF82	24795221	EL, 220 $\mu$ F, $\pm$ 20%, 25V
CF84	24794470	EL, 47 $\mu$ F, $\pm$ 20%, 16V
CG03	24781470	Chip, 47pF
CG05	24287103	Chip, 0.01 $\mu$ F, +80%, -20%
CG06	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG07	24276160	Chip, 16pF
CG08	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG09	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG10	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG11	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG12	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG13	24203220	EL, 22 $\mu$ F, $\pm$ 20%, 16V
CG14	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG15	24774510	Chip, 51pF
CG16	24783220	Chip, 22pF
CG17	24781201	Chip, 200pF
CG18	24774150	Chip, 15pF
CG19	24287103	Chip, 0.01 $\mu$ F, +80%, -20%
CG20	24206010	EL, 1 $\mu$ F, 50V
CG21	24206010	EL, 1 $\mu$ F, 50V
CG22	24590152	PF, 1500pF
CG23	24590152	PF, 1500pF
CG24	24794471	EL, 470 $\mu$ F, $\pm$ 20%, 16V
CG25	24206229	EL, 2.2 $\mu$ F, 50V
CG26	24206229	EL, 2.2 $\mu$ F, 50V
CG27	24590332	PF, 3300pF
CG28	24436681	CD, 680pF
CG29	24590104	PF, 0.1 $\mu$ F
CG30	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG31	24590104	PF, 0.1 $\mu$ F
CG34	24590104	PF, 0.1 $\mu$ F
CG35	24538474	PF, 0.47 $\mu$ F
CG36	24538474	PF, 0.47 $\mu$ F
CG37	24206010	EL, 1 $\mu$ F, 50V
CG38	24206010	EL, 1 $\mu$ F, 50V
CG39	24590153	PF, 0.015 $\mu$ F
CG40	24590153	PF, 0.015 $\mu$ F
CG41	24590473	PF, 0.047 $\mu$ F
CG42	24590473	PF, 0.047 $\mu$ F
CG43	24815103	Chip, 0.01 $\mu$ F, $\pm$ 10%
CG44	24590103	PF, 0.01 $\mu$ F
CG45	24590102	PF, 1000pF
CG55	24093950	Variable Capacitor, 5.5 to 30pF, 100V
CG60	24794221	EL, 220 $\mu$ F, 16V
CG80	24781201	Chip, 200pF

Location No.	Part No.	Description
CG81	24783220	Chip, 22pF
CG82	24774680	Chip, 68pF
CG83	24774150	Chip, 15pF
CG84	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CG85	24203470	EL, 47 $\mu$ F, $\pm$ 20%, 16V
CG86	24814103	Chip, 0.01 $\mu$ F, +80%, -20%
CM01	24436201	CD, 200pF
CM02	24436201	CD, 200pF
CM05	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CM06	24357270	CD, 27pF
CM07	24590563	PF, 0.056 $\mu$ F
CM08	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CM09	24357200	CD, 20pF
CM10	24473270	CD, 27pF
CM12	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CM14	24357200	CD, 20pF
CN06	24474820	CD, 82pF, $\pm$ 10%
CN09	24353150	CD, 15pF
CN10	24474101	CD, 100pF, $\pm$ 10%
CN12	24353300	CD, 30pF
CN16	24590273	PF, 0.027 $\mu$ F
CN28	24473689	CD, 6.8 $\mu$ F, $\pm$ 10%
CN29	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CN30	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CV01	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CV02	24203100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV03	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV04	24203100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV05	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CV06	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV07	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
CV08	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV09	24474103	CD, 0.01 $\mu$ F, $\pm$ 30%, 16V
CV10	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV11	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV12	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV13	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV14	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV15	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV16	24474102	CD, 1000pF, $\pm$ 10%
CV17	24474102	CD, 1000pF, $\pm$ 10%
CV18	24474102	CD, 1000pF, $\pm$ 10%
CV19	24474102	CD, 1000pF, $\pm$ 10%
CV20	24474102	CD, 1000pF, $\pm$ 10%
CV21	24474102	CD, 1000pF, $\pm$ 10%
CV22	24474102	CD, 1000pF, $\pm$ 10%
CV23	24793471	EL, 470 $\mu$ F, $\pm$ 20%, 10V
CV24	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
CV25	24474102	CD, 1000pF, $\pm$ 10%
CV26	24793471	EL, 470 $\mu$ F, $\pm$ 20%, 10V
CV27	24206339	EL, 3.3 $\mu$ F, 50V
CV29	24590104	PF, 0.1 $\mu$ F
CV30	24474102	CD, 1000pF, $\pm$ 10%
CV31	24474102	CD, 1000pF, $\pm$ 10%
CV32	24474102	CD, 1000pF, $\pm$ 10%
CV33	24474102	CD, 1000pF, $\pm$ 10%
CV36	24797100	EL, 10 $\mu$ F, $\pm$ 20%, 50V
CV37	24203100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV38	24203101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
CV39	24276100	Chip, 10pF
CV47	24794101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
CV51	24203101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
CV70	24794101	EL, 100 $\mu$ F, $\pm$ 20%, 16V
CV71	24232103	CD, 0.01 $\mu$ F, +80%, -20%

Location No.	Part No.	Description
CV72	24203100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV73	24474820	CD, 82pF, $\pm$ 10%
CV82	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV83	24794100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV85	24203100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV86	24203100	EL, 10 $\mu$ F, $\pm$ 20%, 16V
CV96	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CV97	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CV98	24590562	PF, 5600pF
CV99	24590562	PF, 5600pF
CX02	24538474	PF, 0.47 $\mu$ F
CX03	24538474	PF, 0.47 $\mu$ F
CX04	24538474	PF, 0.47 $\mu$ F
CY51	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY52	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY53	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY54	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY55	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY56	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY57	24206010	EL, 1 $\mu$ F, 50V
CY58	24206010	EL, 1 $\mu$ F, 50V
CY59	24206010	EL, 1 $\mu$ F, 50V
CY60	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY61	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY62	24797010	EL, 1 $\mu$ F, $\pm$ 20%, 50V
CY63	24793221	EL, 220 $\mu$ F, $\pm$ 20%, 10V
CY64	24590104	PF, 0.1 $\mu$ F

## RESISTORS

R101	24872122	Chip, 1200 ohm, 1/16W
R102	24871100	Chip, 10 ohm, 1/8W
R103	24872824	Chip, 820k ohm, 1/16W
R104	24872102	Chip, 1000 ohm, 1/16W
R105	24872104	Chip, 100k ohm, 1/16W
R106	24872682	Chip, 6800 ohm, 1/16W
R107	24872391	Chip, 390 ohm, 1/16W
R108	24872561	Chip, 560 ohm, 1/16W
R110	24872562	Chip, 5600 ohm, 1/16W
R111	24872472	Chip, 47 ohm, 1/16W
R112	24872182	Chip, 1800 ohm, 1/16W
R113	24872220	Chip, 22 ohm, 1/16W
R117	24871223	Chip, 22k ohm, 1/8W
R119	24872131	Chip, 130 ohm, 1/16W
R120	24872151	Chip, 150 ohm, 1/16W
R121	24872331	Chip, 330 ohm, 1/16W
R122	24872121	Chip, 120 ohm, 1/16W
R124	24871181	Chip, 180 ohm, 1/8W
R125	24552271	OMF, 270 ohm, 1/2W
R126	24553680	OMF, 68 ohm, 1W
R128	24871104	Chip, 100k ohm, 1/8W
R151	24066599	VR, 5k ohm, 1/10W
R153	24066606	VR, 1M ohm, 1/10W
R170	24872102	Chip, 1000 ohm, 1/16W
R171	24872334	Chip, 330k ohm, 1/16W
R201	24366122	CF, 1200 ohm
R202	24366471	CF, 470 ohm
R203	24366472	CF, 4700 ohm
R204	24366132	CF, 1300 ohm
R205	24366182	CF, 1800 ohm
R206	24871361	Chip, 360 ohm, 1/8W
R207	24872101	Chip, 100 ohm, 1/16W
R208	24552471	OMF, 470 ohm, 1/2W
R210	24871101	Chip, 100 ohm, 1/8W
R211	24366102	CF, 1k ohm

Location No.	Part No.	Description
R212	24366103	CF, 10k ohm
R213	24366152	CF, 1500 ohm
R214(U101)	24872102	Chip, 1000 ohm, 1/16W
R214(U902)	24366122	CF, 1200 ohm
R219	24366472	CF, 4700 ohm
R220	24366223	CF, 22k ohm
R221	24366223	CF, 22k ohm
R222	24366301	CF, 300 ohm
R242	24366203	CF, 20k ohm
R243	24366183	CF, 18k ohm
R252	24066597	VR, 1k ohm, 1/10W
R253	24066597	VR, 1k ohm, 1/10W
R261	24000576	Chip, Jumper 3216 type
R301	24366301	CF, 300 ohm
R302	24366244	CF, 240k ohm
R305	24366161	CF, 160 ohm
R317	24366102	CF, 1k ohm
R326	24382470	OMF, 47 ohm, 1W
△ R327	24532130	FR, 13 ohm, 1W
R329	24366162	CF, 1600 ohm
R330	24366472	CF, 4700 ohm
R331	24366103	CF, 10k ohm
R332	24366683	CF, 68k ohm
R333	24366563	CF, 56k ohm
R334	24366103	CF, 10k ohm
R335	24366102	CF, 1k ohm
R336	24383271	OMF, 270 ohm, 2W
R337	24552202	OMF, 2k ohm, 1/2W
R338	24552122	OMF, 1200 ohm, 1/2W
R339	24322139	OMF, 1.3 ohm, 1W
R340	24366303	CF, 30k ohm
R341	24366183	CF, 18k ohm
R342	24366203	CF, 20k ohm
R343	24366473	CF, 47k ohm
R344	24366103	CF, 10k ohm
R345	24366125	CF, 1.2M ohm
R346	24366753	CF, 75k ohm
R347	24366684	CF, 680k ohm
R349	24366473	CF, 47k ohm
R351	24066602	VR, 50k ohm, 1/10W
R402	24366273	CF, 27k ohm
R403	24366302	CF, 3k ohm
R404	24552432	OMF, 4300 ohm, 1/2W
R405	24366431	CF, 430 ohm
R408	24366682	CF, 6800 ohm
R409	24366434	CF, 430k ohm
R410	24552472	OMF, 4700 ohm, 1/2W
R411	24366391	CF, 390 ohm
R412	24366121	CF, 120 ohm
R416	24007566	Cement, 2k ohm, 5W
R419	24942510	CC, 51 ohm, 1/2W
R420	24009951	OMF, 1k ohm, 1W
R421	24366105	CF, 1M ohm
R440	24552103	OMF, 10k ohm, 1/2W
R441	24552103	OMF, 10k ohm, 1/2W
△ R444	24007768	Cement, 15 ohm, 10W
R445	24383561	OMF, 560 ohm, 2W
△ R448	24322159	OMF, 1.5 ohm, 1W
R502	24366334	CF, 330k ohm
R504	24366391	CF, 390 ohm
R505	24366822	CF, 8200 ohm
R507	24366822	CF, 8200 ohm
R508	24366561	CF, 560 ohm
R509	24366122	CF, 1200 ohm

Location No.	Part No.	Description
R510	24366332	CF, 3300 ohm
R511	24366202	CF, 2k ohm
R512	24366182	CF, 1800 ohm
R513	24366122	CF, 1200 ohm
R514	24366223	CF, 22k ohm
R515	24366221	CF, 220 ohm
R516	24366221	CF, 220 ohm
R517	24366221	CF, 220 ohm
R518	24366223	CF, 22k ohm
R519	24366475	CF, 4.7M ohm
R520	24366332	CF, 3300 ohm
R521	24366102	CF, 1k ohm
R522	24366185	CF, 1.8M ohm
R525	24366133	CF, 13k ohm
R527	24366821	CF, 820 ohm
R528	24366561	CF, 560 ohm
R529	24366101	CF, 100 ohm
R530	24366101	CF, 100 ohm
R532	24366102	CF, 1k ohm
R533	24366162	CF, 1600 ohm
R535	24366301	CF, 300 ohm
R537	24366162	CF, 1600 ohm
R538	24366331	CF, 330 ohm
R539	24366162	CF, 1600 ohm
R541	24366821	CF, 820 ohm
R542	24366201	CF, 200 ohm
R543	24366103	CF, 10k ohm
R544	24366101	CF, 100 ohm
R545	24366102	CF, 1k ohm
R546	24366333	CF, 33k ohm
R547	24366102	CF, 1k ohm
R548	24366102	CF, 1k ohm
R549	24366102	CF, 1k ohm
R551	24066955	VR, 1k ohm, 1/10W
R557	24066600	VR, 10k ohm, 1/10W
R558	24066600	VR, 10k ohm, 1/10W
R559	24066600	VR, 10k ohm, 1/10W
R565	24366560	CF, 56 ohm
R566	24366560	CF, 56 ohm
R567	24366560	CF, 56 ohm
R568	24366102	CF, 1k ohm
R570	24366272	CF, 2700 ohm
R571	24366272	CF, 2700 ohm
R572	24366272	CF, 2700 ohm
R580	24366391	CF, 390 ohm
R581	24366331	CF, 330 ohm
R591	24009974	OMF, 15k ohm, 2W
R592	24009974	OMF, 15k ohm, 2W
R593	24009974	OMF, 15k ohm, 2W
R601	24872242	Chip, 2400 ohm, 1/16W
R602	24872183	Chip, 18k ohm, 1/16W
R603	24872202	Chip, 2k ohm, 1/16W
R604	24872271	Chip, 270 ohm, 1/16W
R605	24553430	OMF, 43 ohm, 1W
R606	24872821	Chip, 820 ohm, 1/16W
R607	24872430	Chip, 43 ohm, 1/16W
R614	24872271	Chip, 270 ohm, 1/16W
R630	24366332	CF, 3300 ohm
R631	24366332	CF, 3300 ohm
R638	24366432	CF, 4300 ohm
R640	24366222	CF, 2200 ohm
R641	24366432	CF, 4300 ohm
R643	24366222	CF, 2200 ohm
R644	24321229	OMF, 2.2 ohm, 1/2W

Location No.	Part No.	Description
R645	24321229	OMF, 2.2 ohm, 1/2W
R646	24366223	CF, 22k ohm
R647	24366223	CF, 22k ohm
R649	24366913	CF, 91k ohm
R665	24552181	OMF, 180 ohm, 1/2W
R666	24552181	OMF, 180 ohm, 1/2W
R668	24366362	CF, 3600 ohm
R669	24366272	CF, 2700 ohm
R670	24366223	CF, 22k ohm
R675	24366101	CF, 100 ohm
R676	24366101	CF, 100 ohm
R801	24004914	CC, 5.6M ohm, 1/2W
△ R802	24007857	Cement, 6.2 ohm, 15W
R810	24377274	CF, 270k ohm, 1W
R811	24366103	CF, 10k ohm
R812	24366102	CF, 1k ohm
R813	24366102	CF, 1k ohm
R814	24366823	CF, 82k ohm
R815	24366221	CF, 220 ohm
R816	24367471	CF, 470 ohm, ±2%
R817	24321398	OMF, 0.39 ohm, 1/2W
R818	24384153	OMF, 15k ohm, 3W
R819	24366689	CF, 6.8 ohm
R820	24552102	OMF, 1k ohm, 1/2W
R821	24007743	Cement, 180 ohm, 10W
R822	24366390	CF, 39 ohm
R824	24366123	CF, 12k ohm
R825	24381220	OMF, 22 ohm, 1/2W
R826	24366102	CF, 1k ohm
R827	24366102	CF, 1k ohm
R830	24383203	OMF, 2k ohm, 2W
R831	24384822	OMF, 8200 ohm, 3W
R836	24321228	OMF, 0.22 ohm, 1/2W
R838	24383102	OMF, 1k ohm, 2W
R839	24366103	CF, 10k ohm
R840	24366105	CF, 1M ohm
R841	24366103	CF, 10k ohm
R842	24000900	FR, 0.47 ohm, ±10%, 1W
R843	24366103	CF, 10k ohm
R844	24366105	CF, 1M ohm
R845	24366392	CF, 3900 ohm
R846	24366562	CF, 5600 ohm
R847	24553473	OMF, 47k ohm, 1W
R849	24366272	CF, 2700 ohm
R861	24007642	Cement, 5600 ohm, 5W
R862	24383103	OMF, 10k ohm, 2W
R863	24366103	CF, 10k ohm
R871	24366103	CF, 10k ohm
R872	24366103	CF, 10k ohm
R873	24366103	CF, 10k ohm
R874	24366103	CF, 10k ohm
R875	24366562	CF, 5600 ohm
R877	24366102	CF, 1k ohm
R878	24366103	CF, 10k ohm
R880	24366682	CF, 6800 ohm
R882	24366513	CF, 51k ohm
R883	24366103	CF, 10k ohm
R884	24366103	CF, 10k ohm
R885	24366103	CF, 10k ohm
R886	24366103	CF, 10k ohm
△ R890	24000630	PTC Thermistor, Dual
R901	24946272	CC, 2700 ohm, ±10%, 1/2W
R902	24946272	CC, 2700 ohm, ±10%, 1/2W
R903	24946272	CC, 2700 ohm, ±10%, 1/2W

Location No.	Part No.	Description
R920	24000888	FR, 2 ohm, 1W
RA01	24366183	CF, 18k ohm
RA02	24366562	CF, 5600 ohm
RA03	24366103	CF, 10k ohm
RA04	24366473	CF, 47k ohm
RA05	24366473	CF, 47k ohm
RA06	24366473	CF, 47k ohm
RA07	24366222	CF, 2200 ohm
RA08	24366101	CF, 100 ohm
RA09	24366392	CF, 3900 ohm
RA10	24366104	CF, 100k ohm
RA11	24366103	CF, 10k ohm
RA12	24366103	CF, 10k ohm
RA13	24366102	CF, 1k ohm
RA14	24366473	CF, 47k ohm
RA15	24366103	CF, 10k ohm
RA16	24366103	CF, 10k ohm
RA17	24366103	CF, 10k ohm
RA18	24366103	CF, 10k ohm
RA19	24366102	CF, 1k ohm
RA20	24366103	CF, 10k ohm
RA21	24366561	CF, 560 ohm
RA22	24366561	CF, 560 ohm
RA23	24366103	CF, 10k ohm
RA24	24366225	CF, 2.2M ohm
RA25	24366153	CF, 15k ohm
RA26	24946226	CC, 22M ohm, $\pm 10\%$ , 1/2W
RA27	24366333	CF, 33k ohm
RA28	24366333	CF, 33k ohm
RA29	24366103	CF, 10k ohm
RA30	24366473	CF, 47k ohm
RA31	24366473	CF, 47k ohm
RA32	24366473	CF, 47k ohm
RA33	24366473	CF, 47k ohm
RA34	24366333	CF, 33k ohm
RA35	24366223	CF, 22k ohm
RA36	24366102	CF, 1k ohm
RA37	24366473	CF, 47k ohm
RA38	24366331	CF, 330 ohm
RA40	24366472	CF, 4700 ohm
RA42	24366472	CF, 4700 ohm
RA43	24366103	CF, 10k ohm
RA44	24366103	CF, 10k ohm
RA45	24366183	CF, 18k ohm
RA46	24366123	CF, 12k ohm
RA47	24366152	CF, 1500 ohm
RA48	24366473	CF, 47k ohm
RA56	24366123	CF, 12k ohm
RA57	24366392	CF, 3900 ohm
RA58	24366152	CF, 1500 ohm
RA59	24366392	CF, 3900 ohm
RA60	24366392	CF, 3900 ohm
RA61	24366102	CF, 1k ohm
RA62	24366103	CF, 10k ohm
RA63	24366103	CF, 10k ohm
RA66	24366102	CF, 1k ohm
RA67	24366153	CF, 15k ohm
RA70	24366561	CF, 560 ohm
RA71	24366564	CF, 560k ohm
RA72	24366563	CF, 56k ohm
RA73	24366123	CF, 12k ohm
RA74	24366392	CF, 3900 ohm
RA75	24366103	CF, 10k ohm
RA76	24366473	CF, 47k ohm

Location No.	Part No.	Description
RA79	24366153	CF, 15k ohm
RA81	24366101	CF, 100 ohm
RA82	24366101	CF, 100 ohm
RA83	24366103	CF, 10k ohm
RA84	24366103	CF, 10k ohm
RA85	24366103	CF, 10k ohm
RA86	24366103	CF, 10k ohm
RA87	24366103	CF, 10k ohm
RA89	24366471	CF, 470 ohm
RA90	24366391	CF, 390 ohm
RA91	24366223	CF, 22k ohm
RA92	24366473	CF, 47k ohm
RA93	24366391	CF, 390 ohm
RA95	24366473	CF, 47k ohm
RA96	24366102	CF, 1k ohm
RA97	24366101	CF, 100 ohm
RA98	24366101	CF, 100 ohm
RB01	24366103	CF, 10k ohm
RB02	24366332	CF, 3300 ohm
RB03	24366103	CF, 10k ohm
RB04	24366103	CF, 10k ohm
RB05	24366222	CF, 2200 ohm
RB06	24366473	CF, 47k ohm
RF03	24366100	CF, 10 ohm
RF04	24366273	CF, 27k ohm
RF05	24366472	CF, 4700 ohm
RF06	24366103	CF, 10k ohm
RF07	24366103	CF, 10k ohm
RF08	24366101	CF, 100 ohm
RF09	24366101	CF, 100 ohm
RF11	24366272	CF, 2700 ohm
RF12	24366103	CF, 10k ohm
RF13	24366101	CF, 100 ohm
RF14	24366101	CF, 100 ohm
RF15	24366392	CF, 3900 ohm
RF16	24366682	CF, 6800 ohm
RF17	24366332	CF, 3300 ohm
RF18	24366682	CF, 6800 ohm
RF19	24366101	CF, 100 ohm
RF80	24546279	FR, 2.7 ohm, 1/2W
RF81	24383123	OMF, 12k ohm, 2W
RG02	24872361	Chip, 360 ohm, 1/16W
RG03	24872102	Chip, 1000 ohm, 1/16W
RG04	24872563	Chip, 56k ohm, 1/16W
RG05	24872563	Chip, 56k ohm, 1/16W
RG06	24872102	Chip, 1000 ohm, 1/16W
RG07	24872102	Chip, 1000 ohm, 1/16W
RG08	24872332	Chip, 3300 ohm, 1/16W
RG10	24872303	Chip, 30k ohm, 1/16W
RG11	24872102	Chip, 1000 ohm, 1/16W
RG12	24872472	Chip, 47 ohm, 1/16W
RG13	24872472	Chip, 47 ohm, 1/16W
RG14	24872223	Chip, 22k ohm, 1/16W
RG18	24872223	Chip, 22k ohm, 1/16W
RG19	24872103	Chip, 10k ohm, 1/16W
RG21	24871223	Chip, 22k ohm, 1/8W
RG23	24872223	Chip, 22k ohm, 1/16W
RG25	24872203	Chip, 20k ohm, 1/16W
RG26	24872202	Chip, 2k ohm, 1/16W
RG27	24872103	Chip, 10k ohm, 1/16W
RG28	24871223	Chip, 22k ohm, 1/8W
RG29	24872103	Chip, 10k ohm, 1/16W
RG31	24872101	Chip, 100 ohm, 1/16W
RG32	24872101	Chip, 100 ohm, 1/16W

Location No.	Part No.	Description
RG34	24872102	Chip, 1000 ohm, 1/16W
RG35	24872562	Chip, 5600 ohm, 1/16W
RG36	24872472	Chip, 47 ohm, 1/16W
RG37	24872563	Chip, 56k ohm, 1/16W
RG38	24872101	Chip, 100 ohm, 1/16W
RG40	24872101	Chip, 100 ohm, 1/16W
RG42	24872101	Chip, 100 ohm, 1/16W
RG44	24872101	Chip, 100 ohm, 1/16W
RG45	24872103	Chip, 10k ohm, 1/16W
RG46	24872101	Chip, 100 ohm, 1/16W
RG47	24872272	Chip, 2700 ohm, 1/16W
RG50	24066926	VR, 10k ohm, 1/10W
RG60	24553101	OMF, 100 ohm, 1W
RG61	24872152	Chip, 1500 ohm, 1/16W
RG62	24872102	Chip, 1000 ohm, 1/16W
RG63	24872222	Chip, 2200 ohm, 1/16W
RG64	24872273	Chip, 27k ohm, 1/16W
RG65	24872133	Chip, 13k ohm, 1/16W
RG66	24872152	Chip, 1500 ohm, 1/16W
RG67	24872273	Chip, 27k ohm, 1/16W
RG68	24872133	Chip, 13k ohm, 1/16W
RG70	24872222	Chip, 2200 ohm, 1/16W
RG81	24872152	Chip, 1500 ohm, 1/16W
RG82	24872162	Chip, 1600 ohm, 1/16W
RG83	24872153	Chip, 15k ohm, 1/16W
RG84	24872102	Chip, 1000 ohm, 1/16W
RG85	24872471	Chip, 470 ohm, 1/16W
RG90	24545100	FR, 10 ohm, 1/4W
RM03	24366272	CF, 2700 ohm
RM04	24366432	CF, 4300 ohm
RM05	24366221	CF, 220 ohm
RM06	24366271	CF, 270 ohm
RM07	24366475	CF, 4.7M ohm
RM08	24366333	CF, 33k ohm
RN06	24366473	CF, 47k ohm
RN07	24366223	CF, 22k ohm
RN08	24366185	CF, 1.8M ohm
RN09	24366103	CF, 10k ohm
RN18	24366473	CF, 47k ohm
RN19	24366103	CF, 10k ohm
RN23	24366473	CF, 47k ohm
RN26	24366133	CF, 13k ohm
RN28	24366202	CF, 2k ohm
RN29	24366272	CF, 2700 ohm
RN32	24366243	CF, 24k ohm
RV02	24366101	CF, 100 ohm
RV03	24366101	CF, 100 ohm
RV04	24366101	CF, 100 ohm
RV05	24366101	CF, 100 ohm
RV06	24366101	CF, 100 ohm
RV07	24366101	CF, 100 ohm
RV08	24366101	CF, 100 ohm
RV09	24366101	CF, 100 ohm
RV10	24366101	CF, 100 ohm
RV11	24366101	CF, 100 ohm
RV12	24366101	CF, 100 ohm
RV13	24366101	CF, 100 ohm
RV14	24366101	CF, 100 ohm
RV15	24366101	CF, 100 ohm
RV16	24366104	CF, 100k ohm
RV17	24366104	CF, 100k ohm
RV18	24366104	CF, 100k ohm
RV19	24366104	CF, 100k ohm
RV20	24366104	CF, 100k ohm

Location No.	Part No.	Description
RV21	24366104	CF, 100k ohm
RV22	24366104	CF, 100k ohm
RV23	24366104	CF, 100k ohm
RV24	24366471	CF, 470 ohm
RV25	24366331	CF, 330 ohm
RV26	24366680	CF, 68 ohm
RV27	24366102	CF, 1k ohm
RV28	24366102	CF, 1k ohm
RV29	24366820	CF, 82 ohm
RV31	24366910	CF, 91 ohm
RV32	24366910	CF, 91 ohm
RV34	24872102	Chip, 1000 ohm, 1/16W
RV34	24366102	CF, 1k ohm
RV35	24872471	Chip, 470 ohm, 1/16W
RV36	24872103	Chip, 10k ohm, 1/16W
RV37	24872332	Chip, 3300 ohm, 1/16W
RV39	24366910	CF, 91 ohm
RV40	24366680	CF, 68 ohm
RV41	24366103	CF, 10k ohm
RV42	24366750	CF, 75 ohm
RV43	24366750	CF, 75 ohm
RV44	24366750	CF, 75 ohm
RV45	24366750	CF, 75 ohm
RV51	24552101	OMF, 100 ohm, 1/2W
RV52	24872102	Chip, 1000 ohm, 1/16W
RV53	24871101	Chip, 100 ohm, 1/8W
RV56	24552161	OMF, 160 ohm, 1/2W
RV60	24552101	OMF, 100 ohm, 1/2W
RV69	24366102	CF, 1k ohm
RV70	24366471	CF, 470 ohm
RV73	24366910	CF, 91 ohm
RV74	24366103	CF, 10k ohm
RV75	24366821	CF, 820 ohm
RV76	24366201	CF, 200 ohm
RV77	24366101	CF, 100 ohm
RV78	24366101	CF, 100 ohm
RV79	24552391	OMF, 390 ohm, 1/2W
RV80	24366102	CF, 1k ohm
RV81	24366101	CF, 100 ohm
RV82	24366621	CF, 620 ohm
RV83	24366621	CF, 620 ohm
RV84	24366621	CF, 620 ohm
RV85	24366621	CF, 620 ohm
RV86	24366471	CF, 470 ohm
RV87	24366331	CF, 330 ohm
RW04	24366101	CF, 100 ohm
RW07	24366101	CF, 100 ohm
RW15	24366104	CF, 100k ohm
RW16	24366104	CF, 100k ohm
RW21	24366471	CF, 470 ohm
RW22	24366471	CF, 470 ohm
RW24	24366471	CF, 470 ohm
RW25	24366471	CF, 470 ohm
RW26	24366104	CF, 100k ohm
RW28	24366472	CF, 4700 ohm
RW29	24366104	CF, 100k ohm
RW40	24366910	CF, 91 ohm
RW80	24366101	CF, 100 ohm
RW81	24366101	CF, 100 ohm
RW83	24552161	OMF, 160 ohm, 1/2W
RY01	24366473	CF, 47k ohm
RY02	24366183	CF, 18k ohm
RY03	24366391	CF, 390 ohm
RY04	24366473	CF, 47k ohm

Location No.	Part No.	Description
RY51	24366101	CF, 100 ohm
RY52	24366101	CF, 100 ohm
RY53	24366101	CF, 100 ohm
RY54	24366101	CF, 100 ohm
RY55	24366181	CF, 180 ohm
RY56	24366181	CF, 180 ohm
RY57	24366181	CF, 180 ohm
RY61	24366152	CF, 1500 ohm
RY62	24366511	CF, 510 ohm
RY63	24366101	CF, 100 ohm
RY64	24366101	CF, 100 ohm
RY65	24366101	CF, 100 ohm
RY66	24366122	CF, 1200 ohm
RY67	24366122	CF, 1200 ohm
RY68	24366122	CF, 1200 ohm

### COILS & TRANSFORMERS

L101	23262819	Coil, PIF, TRF1071D
L102	23238704	Coil, Peaking, TRF4680AJ
L103	23238704	Coil, Peaking, TRF4680AJ
L104	23262650	Coil, IF, TRF1149D
L107	23262951	Coil, RF Choke, TRF1019
L108	23238558	Coil, Peaking, TRF4R47AJ
L151	23262783	Coil, IF, TRF1105
L152	23262813	Coil, IF, TRF1077D
L201	23238714	Coil, Peaking, TRF4100AJ
L202	23238718	Coil, Peaking, TRF4479AJ
L203	23238914	Coil, Peaking, TRF4470AC
L204	23238720	Coil, Peaking, TRF4339AJ
L208	23238704	Coil, Peaking, TRF4680AJ
L220	23238706	Coil, Peaking, TRF4470AJ
L315	23238714	Coil, Peaking, TRF4100AJ
L330	23238714	Coil, Peaking, TRF4100AJ
L331	23103901	Coil (Ferrite Bead), TEM2017
L405	23221685	Coil, Choke, TLN3193
L406	23103859	Coil (Ferrite Bead), TEM2011
L411	23222657	Coil, Linearity, TLN2072
△ L462	.....	DY, Supplied with V901
L503	23238714	Coil, Peaking, TRF4100AJ
L525	23238708	Coil, Peaking, TRF4330AJ
L551	23250972	Coil, 1H-Delay Matching, TRF5418D
L590	23289221	Coil, Peaking, TRF4221AF
L591	23238714	Coil, Peaking, TRF4100AJ
L601	23238714	Coil, Peaking, TRF4100AJ
L801	23221077	Coil, Choke, TLN1015S
L802	23103859	Coil (Ferrite Bead), TEM2011
L803	23221747	Coil, Choke, TRF9253D
L804	23221747	Coil, Choke, TRF9253D
L806	23103859	Coil (Ferrite Bead), TEM2011
L829	23238714	Coil, Peaking, TRF4100AJ
L830	23222694	Coil, Width, TLN2026
L833	23222694	Coil, Width, TLN2026
L834	23103859	Coil (Ferrite Bead), TEM2011
△ L901	23200205	Coil, Degaussing, TSB-2333AR
LA01	23238562	Coil, Peaking, TRF4109AJ
LA12	23221803	Coil, Choke, TLN3040D
LB01	23262001	Coil, IF, TRF1166D
LF01	23238712	Coil, Peaking, TRF4150AJ
LF02	23238712	Coil, Peaking, TRF4150AJ
LF03	23238720	Coil, Peaking, TRF4339AJ
LF04	23238562	Coil, Peaking, TRF4109AJ
LF05	23238714	Coil, Peaking, TRF4100AJ

Location No.	Part No.	Description
LF06	23238714	Coil, Peaking, TRF4100AJ
LF07	23238714	Coil, Peaking, TRF4100AJ
LF08	23238714	Coil, Peaking, TRF4100AJ
LF09	23238506	Coil, Peaking, TRF4229AJ
LF10	23238506	Coil, Peaking, TRF4229AJ
LF11	23103859	Coil (Ferrite Bead), TEM2011
LF12	23238506	Coil, Peaking, TRF4229AJ
LF13	23238714	Coil, Peaking, TRF4100AJ
LF15	23103859	Coil (Ferrite Bead), TEM2011
LF84	23222694	Coil, Width, TLN2026
LG01	23262808	Coil, IF, TRF1082
LG04	23238713	Coil, Peaking, TRF4120AJ
LG05	23232946	Coil, Variable, TRF3073D
LG80	23232946	Coil, Variable, TRF3073D
LM01	23262797	Coil, IF, TRF1093D
LM02	23262002	Coil, IF, TRF1167D
LM03	23262002	Coil, IF, TRF1167D
LM04	23262798	Coil, IF, TRF1092D
LV01	23238710	Coil, Peaking, TRF4220AJ
LV02	23238715	Coil, Peaking, TRF4829AJ
△ T401	23224983	Transformer, Horiz. Drive, TLN1039
△ T461	23236245	Transformer, Flyback, AT2078/21
T801	23211891	Line Filter, TRF3164
△ T803	23217110	Transformer, Converter, 47317550
TN01	23232002	Coil, Variable, TRE3520D
TN02	23262843	Coil, PIF Trap, TRF1457D

### SEMICONDUCTORS

IC101	23318439	IC, M52008P
IC330	23319459	IC, LA7837
IC408	23319203	IC, MC7812CT
IC501	B0383970	IC, TA8783N
IC605	23318413	IC, LA4282
IC801	23318232	IC, TDA4601
IC805	23318299	IC, L78MR05-FA
ICA01	23319159	IC, CXP80424-119S
ICA05	23119441	IC, LA7910
ICA07	23319016	IC, $\mu$ PD6254CX
ICF02	23319143	IC, SAA5246P/E
ICF03	23319001	IC, IMS1630LP12
ICG01	23318023	IC, TDA6611
ICG03	B0325290	IC, TA7337P
ICG30	B0325290	IC, TA7337P
ICV01	B0383940	IC, TA8777N
ICV22	B0370110	IC, TA78L09S
ICV23	B0370110	IC, TA78L09S
ICY50	B0383930	IC, TA8775N
Q102	A6357139	Transistor, 2SC3125 FA-6
Q103	A6357139	Transistor, 2SC3125 FA-6
Q202	23114691	Transistor, BC557A
Q203	A6335477	Transistor, 2SC2712-Y
Q204	A6534040	Transistor, 2SA1015-Y
Q220	23114689	Transistor, BC547A
Q330B	23035308	Screw, BTB3X8SZN
Q332	23114689	Transistor, BC547A
Q333	23114689	Transistor, BC547A
Q334	23114689	Transistor, BC547A
Q402	A6330069	Transistor, 2SC2482 FA-1
△ Q404	23314375	Transistor, ON4409
Q505	A6363200	Transistor, 2SC3619
Q506	23114689	Transistor, BC547A

Location No.	Part No.	Description
Q507	A6363200	Transistor, 2SC3619
Q508	23114689	Transistor, BC547A
Q509	A6363200	Transistor, 2SC3619
Q510	23114689	Transistor, BC547A
Q512	23114689	Transistor, BC547A
Q514	23114688	Transistor, BC327
Q516	23114689	Transistor, BC547A
Q546	23114689	Transistor, BC547A
Q601	A6335477	Transistor, 2SC2712-Y
Q602	A6335477	Transistor, 2SC2712-Y
Q604	23114691	Transistor, BC557A
Q609	A6342200	Transistor, 2SC2878-A
Q610	A6342200	Transistor, 2SC2878-A
Q802	A6868767	Transistor, 2SD1428
Q810	23114632	Transistor, BC547B
Q811	23114632	Transistor, BC547B
Q812	A6342200	Transistor, 2SC2878-A
Q813	23114632	Transistor, BC547B
Q815	23114632	Transistor, BC547B
Q816	23114632	Transistor, BC547B
Q817	23114632	Transistor, BC547B
Q833	A6907751	Transistor, S1854
Q840	23114546	Transistor, BC557B
Q841	A6547250	Transistor, 2SA1320
Q842	A6325067	Transistor, 2SC2230A-Y
Q843	A6547303	Transistor, 2SA1321
Q844	23114546	Transistor, BC557B
Q845	23314246	Transistor, 2SC2023 LF-4
QA02	A6342200	Transistor, 2SC2878-A
QA03	23114689	Transistor, BC547A
QA04	23114689	Transistor, BC547A
QA06	23114689	Transistor, BC547A
QA10	23114689	Transistor, BC547A
QA11	23114691	Transistor, BC557A
QA12	A6342200	Transistor, 2SC2878-A
QA13	23114689	Transistor, BC547A
QA14	23114689	Transistor, BC547A
QA25	23114689	Transistor, BC547A
QA90	23114689	Transistor, BC547A
QB01	23114689	Transistor, BC547A
QB02	23114689	Transistor, BC547A
QF04	23114689	Transistor, BC547A
QF05	23114689	Transistor, BC547A
QF80	A6842185	Transistor, 2SD553-Y
QG02	A6335477	Transistor, 2SC2712-Y
QG04	A6335477	Transistor, 2SC2712-Y
QG06	A6335477	Transistor, 2SC2712-Y
QG07	A6335477	Transistor, 2SC2712-Y
QG08	A6335477	Transistor, 2SC2712-Y
QG09	A6335477	Transistor, 2SC2712-Y
QG10	A6335477	Transistor, 2SC2712-Y
QG11	A6335477	Transistor, 2SC2712-Y
QG12	A6335477	Transistor, 2SC2712-Y
QN05	23114689	Transistor, BC547A
QN11	A6342200	Transistor, 2SC2878-A
QV02	23114691	Transistor, BC557A
QV04	23118980	Transistor, BC337
QV30	A6541130	Transistor, 2SA1162-Y
QV50	A6357139	Transistor, 2SC3125 FA-6
QV80	23114689	Transistor, BC547A
QY01	A6734585	Transistor, 2SC752GTM-O
D101	A7288601	Diode, 1S2186 FA-1
D102	A7288601	Diode, 1S2186 FA-1
D108	23115878	Diode, Zener, $\mu$ PC574J(L)

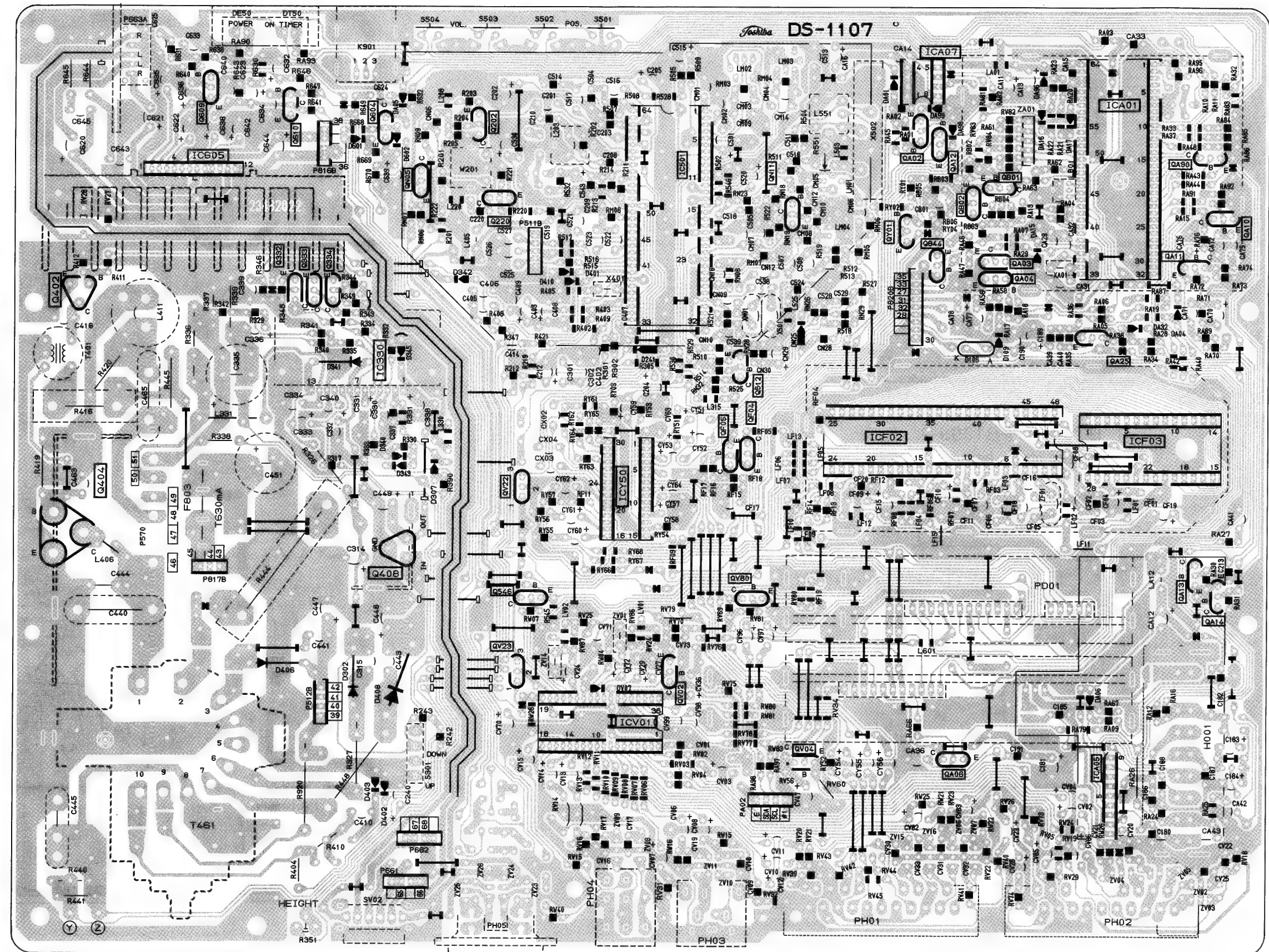
Location No.	Part No.	Description
D109	23115599	Diode, 1N4148
D241	A7150041	Diode, 1SS104
D302	23118479	Diode, BYD33J
D340	23115599	Diode, 1N4148
D341	23118479	Diode, BYD33J
D342	23115599	Diode, 1N4148
D343	23115599	Diode, 1N4148
D345	23316337	Diode, Zener, uZ13BSC
D401	A7116925	Diode, Zener, 04AZ9.1Z
D402	A7118215	Diode, Zener, 04AZ33-Y
D403	A7117215	Diode, Zener, 04AZ12Y
D406	23118479	Diode, BYD33J
D408	23118052	Diode, RU4Z
D410	A7116815	Diode, Zener, 04AZ8.2Y
D594	23115599	Diode, 1N4148
D595	23115599	Diode, 1N4148
D596	23115599	Diode, 1N4148
D601	23115599	Diode, 1N4148
D602	23115599	Diode, 1N4148
D801	23316391	Diode, D3SB60 (4103)
D805	23118479	Diode, BYD33J
D807	23118479	Diode, BYD33J
D808	23118736	Diode, BYV96E
D809	23118451	Diode, RU4A
D810	23118052	Diode, RU4Z
D811	23118479	Diode, BYD33J
D812	A7117305	Diode, Zener, 04AZ13X
D813	23118479	Diode, BYD33J
D814	A8643106	Photo Coupler, TLP621(GR)
D815	23115599	Diode, 1N4148
D830	A8643106	Photo Coupler, TLP621(GR)
D832	23316307	Diode, Zener, uZ5.1BSC
D834	A7275400	Diode, 1S2462
D836	23118052	Diode, RU4Z
D841	A7275400	Diode, 1S2462
D842	A7275400	Diode, 1S2462
D845	23115599	Diode, 1N4148
DA01	A7116425	Diode, Zener, 04AZ5.6Z
DA04	23115599	Diode, 1N4148
DA05	23115599	Diode, 1N4148
DA06	23115599	Diode, 1N4148
DA15	A7116515	Diode, Zener, 04AZ6.2Y
DA16	A7116515	Diode, Zener, 04AZ6.2Y
DA17	A7116515	Diode, Zener, 04AZ6.2Y
DA32	23115599	Diode, 1N4148
DA96	A7116515	Diode, Zener, 04AZ6.2Y
DA98	A7116515	Diode, Zener, 04AZ6.2Y
DA99	A7116515	Diode, Zener, 04AZ6.2Y
DE50	A8636541	Diode (LED), TLS1 53, Red
DF80	A7116415	Diode, Zener, 04AZ5.6Y
DG05	A7288601	Diode, 1S2186 FA-1
DG06	A7288601	Diode, 1S2186 FA-1
DG07	A7288601	Diode, 1S2186 FA-1
DG14	A7150258	Diode, 1SS176
DN25	A7288601	Diode, 1S2186 FA-1
DT50	A8606431	Diode (LED), TLG1 53, Green
DV07	23115599	Diode, 1N4148
<b>MISCELLANEOUS</b>		
B202	23443043	Knob, SUB
△ F801	23144898	Fuse, 3.15A
F801A	23165102	Fuse Holder
△ F803	23144827	Fuse, 0.63A
F803A	23165102	Fuse Holder

Location No.	Part No.	Description
K901	23120303	Remote Sensor, IR-9109-K
P666	23363607	Headphone Jack, 3.5mm
△ P801	23176705	Power Cord
PH01	23365598	21 Pin Connector
PH02	23365598	21 Pin Connector
PH03	23365506	Jack, S+2P
PH04	23365351	Jack, 3P
PH05	23161699	Terminal, 4P
S301	23145682	Switch, Lever, 1C3P
S501	23145430	Switch, Push, 1C1P
S502	23145430	Switch, Push, 1C1P
S503	23145430	Switch, Push, 1C1P
S504	23145430	Switch, Push, 1C1P
△ S801	23145434	Switch, Power, 2C2P
SV02	23145467	Switch, Slide, 2C2P
△ V901A	23902019	Socket, CRT, 10P
W201	23250953	Delay Line, TRF2107A
W661	23351001	Speaker, SPK-1337, 120x60mm, 4 ohm
W662	23351001	Speaker, SPK-1337, 120x60mm, 4 ohm
X401	23153721	Ceramic Resonator, 503kHz, TCR1023
X501	23153979	Crystal, 4.43MHz
X502	23250950	Coil, 1H-Delay Line, DL711
XA01	23153845	Ceramic Resonator, 4MHz, TCR1015
XN01	23153961	Crystal, 3.58MHz
Z101	A5615249	PIF SAW Filter, F1804D
Z201	23107927	Ceramic Video Trap, 5.5MHz, TCF1011
Z202	23107913	Ceramic Video Trap, 6.5MHz, TCF1018
Z661	23107742	Filter, TEM1014
Z662	23107742	Filter, TEM1014
Z663	23107742	Filter, TEM1014
Z664	23107742	Filter, TEM1014
ZF01	23153012	Crystal, 27MHz
ZG03	23107949	Ceramic Filter, 6.5MHz, SFE6.5MBF
ZG04	23107855	Ceramic Filter, 5.5MHz, TCF1031
ZG80	23107856	Ceramic Filter, 5.74MHz, TCF1030
ZV01	23107849	Ceramic Video Trap, 4.43MHz, TCF1032
ZV02	23107744	Filter, 3MHz, TEM1012
ZV03	23107744	Filter, 3MHz, TEM1012
ZV04	23107744	Filter, 3MHz, TEM1012
ZV05	23107744	Filter, 3MHz, TEM1012
ZV06	23107744	Filter, 3MHz, TEM1012
ZV07	23107744	Filter, 3MHz, TEM1012
ZV08	23107744	Filter, 3MHz, TEM1012
ZV09	23107744	Filter, 3MHz, TEM1012
ZV10	23107744	Filter, 3MHz, TEM1012
ZV11	23107744	Filter, 3MHz, TEM1012
ZV14	23107787	Ceramic Video Trap, 3.58MHz, TCF1044
ZV15	23107744	Filter, 3MHz, TEM1012
ZV16	23107744	Filter, 3MHz, TEM1012
ZV23	23107742	Filter, TEM1014
ZV24	23107742	Filter, TEM1014
ZV25	23107742	Filter, TEM1014
ZV26	23107742	Filter, TEM1014

Location No.	Part No.	Description
<b>PC BOARD ASSEMBLIES</b>		
U101	23337786	PIF Board, PB1399-1
U902A	23337788	Main Board, PB1400
U903A	23337789	Power-1 Board, PB1401-1
U903B	23337790	CRT Drive Board, PB1401-2
U903C	23337791	Power-2 Board, PB1401-3
U903D	23337792	Headphone Board, PB1401-4
UG01	23337787	IGR Board, PB1399-2
<b>PICTURE TUBE</b>		
△ V901	23112348	Picture Tube, A51EAL30X01
<b>TUNER</b>		
H001	23321005	Tuner VHF/UHF, EG449X1
<b>REMOTE HAND SET PARTS</b>		
K902	23120032	Remote Hand Unit, CT-9573
AT01	23305026	Upper Case
AT02	23305359	Lower Case
AT03	23305360	Battery Cover
ST01	23305028	Rubber Sheet
UT01	23337760	PC Board, PB1385
ZT01	23153736	Ceramic Resonator, CSB455EB20

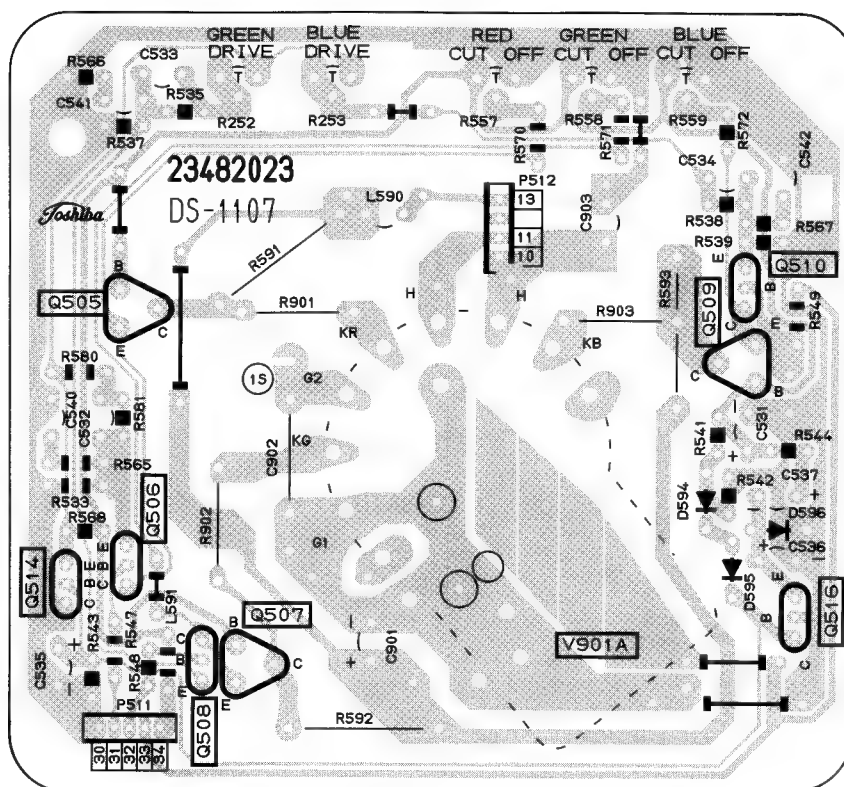
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# MAIN BOARD PB1400 BOTTOM (FOIL) SIDE

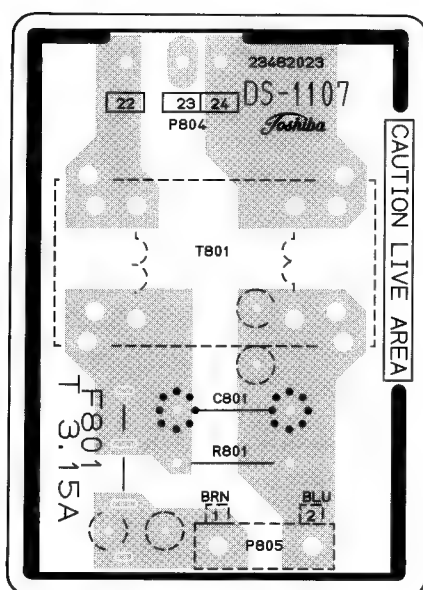




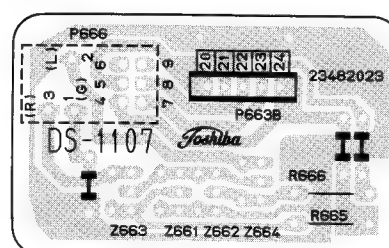
**BOTTOM (FOIL) SIDE**



**BOTTOM (FOIL) SIDE**



**BOTTOM (FOIL) SIDE**



## TERMINAL VIEW OF TRANSISTORS

- ① BC327  
BC337  
BC547A  
BC547B  
BC547C  
BC557A  
BC557B  
BC556A



- ② 2SK30ATM  
2SK117



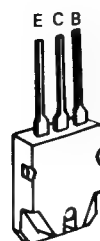
- ③ BD202



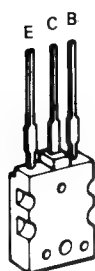
- ④ BF871  
2SD553  
2SC1569



- ⑤ 2SC3678  
2SC3182N



- ⑥ 2SD1427  
2SD1432



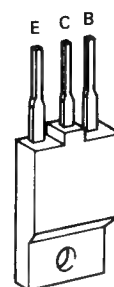
- ⑦ 2SC2482  
2SA1321  
2SC2230  
2SA1020  
2SC2655  
2SC752GTM



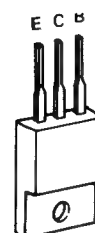
- ⑧ 2SC388ATM  
2SA1015  
2SC1959  
2SA562TM



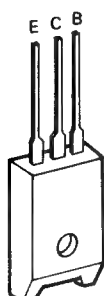
- ⑨ 2SD1548



- ⑩ 2SC2023



- ⑪ ON4409



# 2112DDT

## SCHEMATIC DIAGRAM (2/2)

### IMPORTANT SAFETY NOTICE

Component marked with the International Hazard Symbol must, if changed, be replaced by an approved type and must be mounted as the original. This will ensure that the safety standards adhered to during manufacture will be maintained following any servicing procedure.

### OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltage readings were obtained using a high impedance digital voltmeter.
2. (—) or ground lead of instruments should be connected to the ground marked (⊥) in the schematic on checking Non-isolated circuit surrounded by mark but should be connected to the points marked (⏏) on checking isolated circuit.
3. The voltage readings may vary as much as  $\pm 20\%$ .
4. Check that the Tuning, A.F.C., Brightness, Contrast and Colour controls are adjusted for the best picture, making sure that the Contrast, Brightness and Colour controls are set near to their mid-positions.
5. The waveforms were taken using a standard colour bar signal and were observed using a wide band oscilloscope via a low capacity probe.

### NOTES:

1. This circuit diagram is subject to change without notice.

### EXPRESSION

#### VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000.
2. Unless otherwise noted in schematic, all capacitor values less than 1 are expressed in  $\mu\text{F}$  and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in  $\mu\text{H}$ , and the values less than 1 in H.

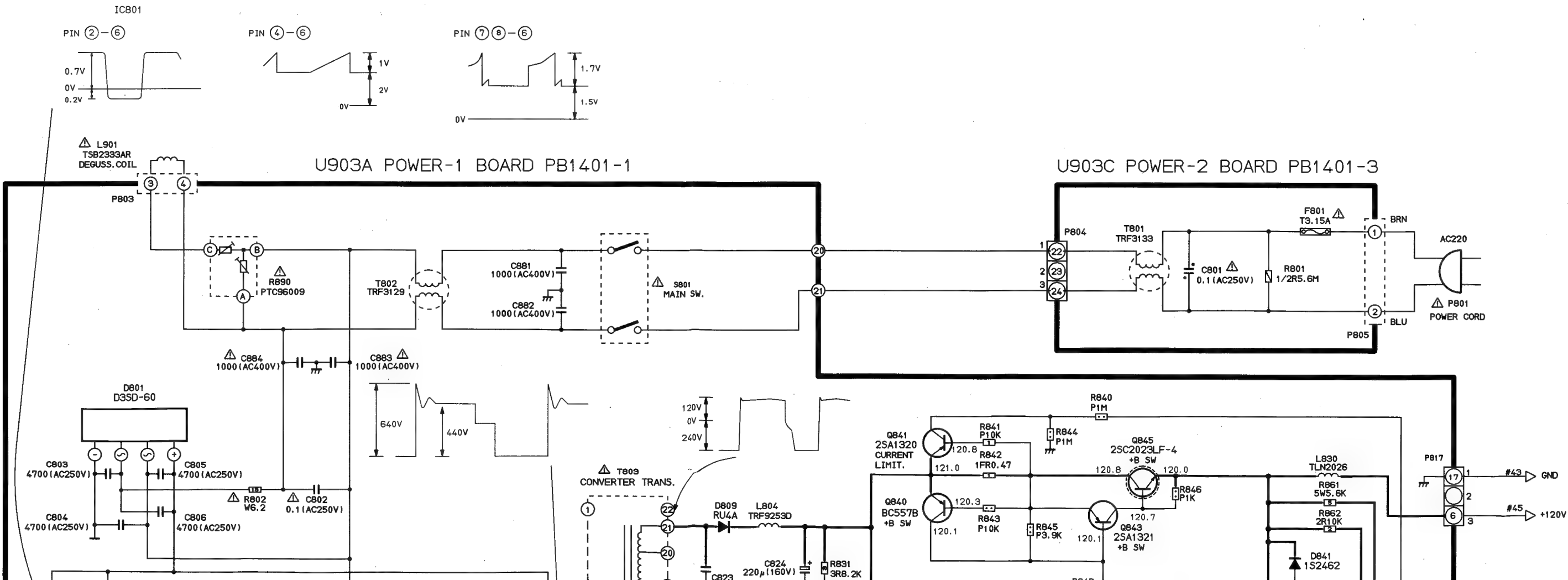
### GROUNDING SYMBOL

1. ⊥: Non isolated ground, ⏏: Isolated ground.

### RESISTOR

Prefixed to value

TY
Carbon
Oxide M
Ins. Carb
Wire W
Cement co
Fusible



**Prefixed to values:**

are expressed in






TOLERANCE	MARK
$\pm 1\%$	(F)
$\pm 2\%$	(G)

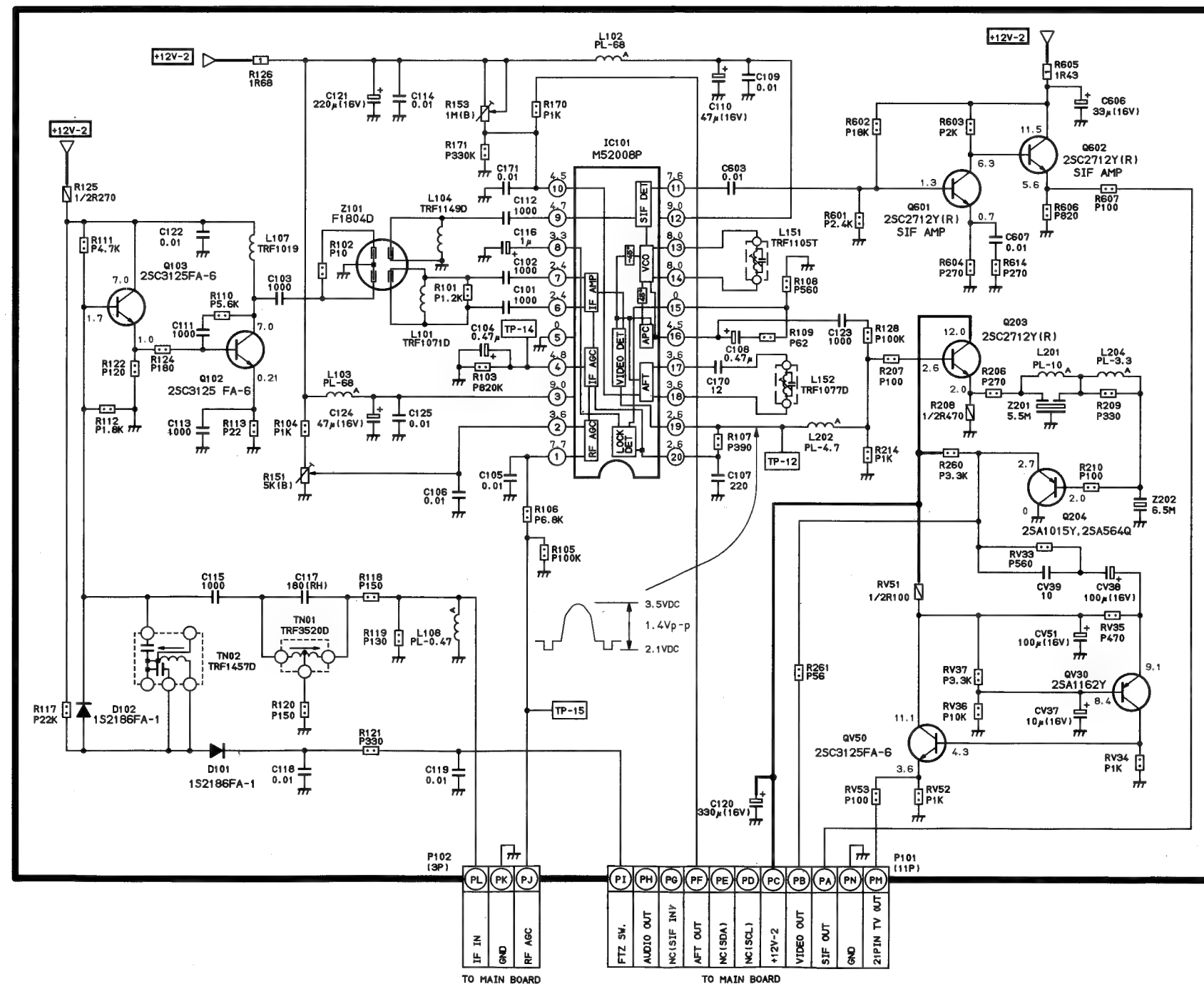
LAW	MARK
Linear	(B)
'C' Curve Characteristic	(C)

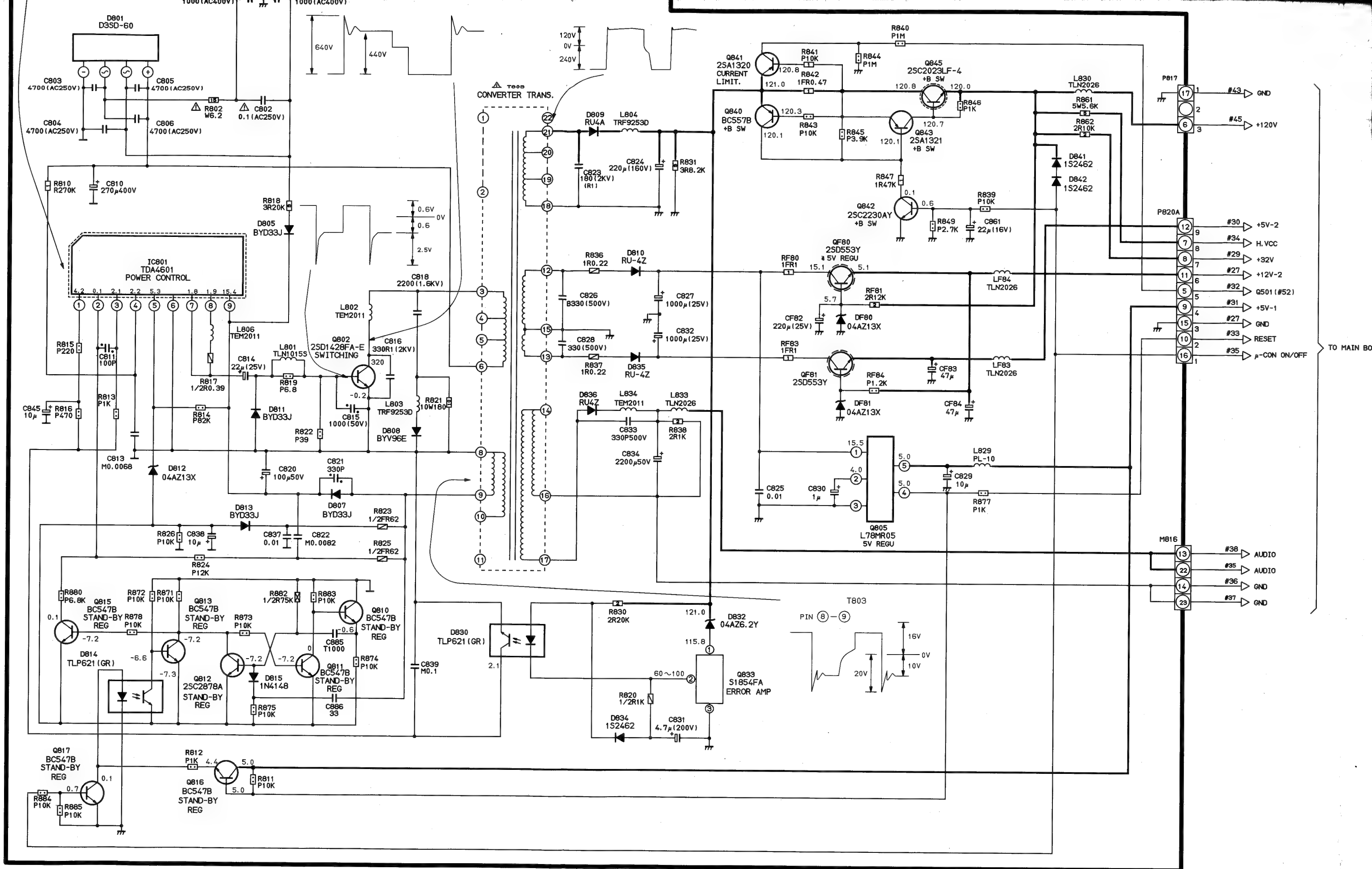
WATTAGE	MARK
1/6W	
1/4W	 
1/2W	
1W	
2W	

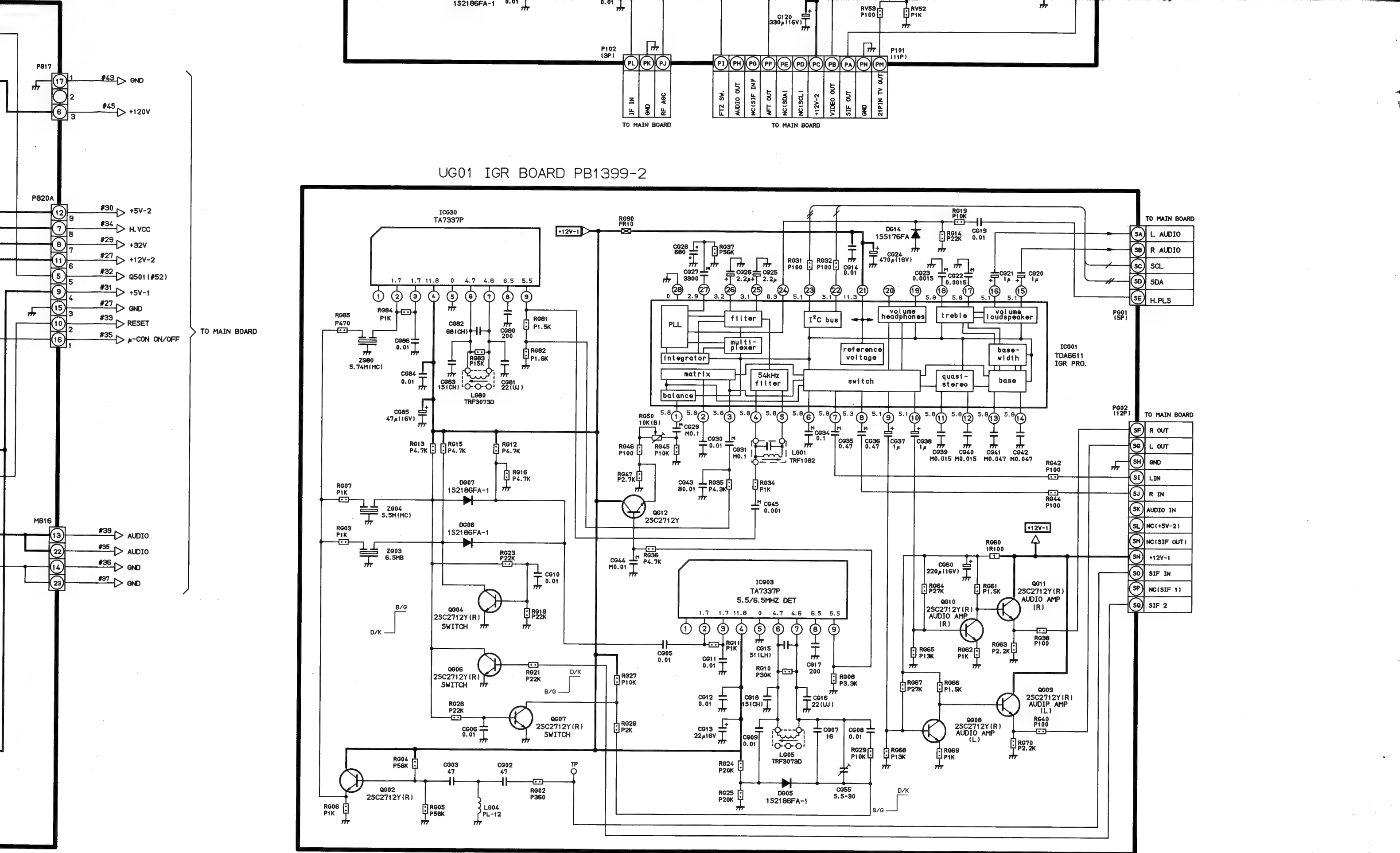
WATTAGE	MARK
3W	<input type="text" value="3"/>
5W	<input type="text" value="5"/>
10W	<input type="text" value="10"/>
15W	<input type="text" value="15"/>
20W	<input type="text" value="20"/>
25W	<input type="text" value="25"/>

**Rating Markings:**

Type	Mark
Ceramic Disc 50V Only	
Electrolytic	
Electrolytic Non-Polar	
Variable Capacitor	
Other	

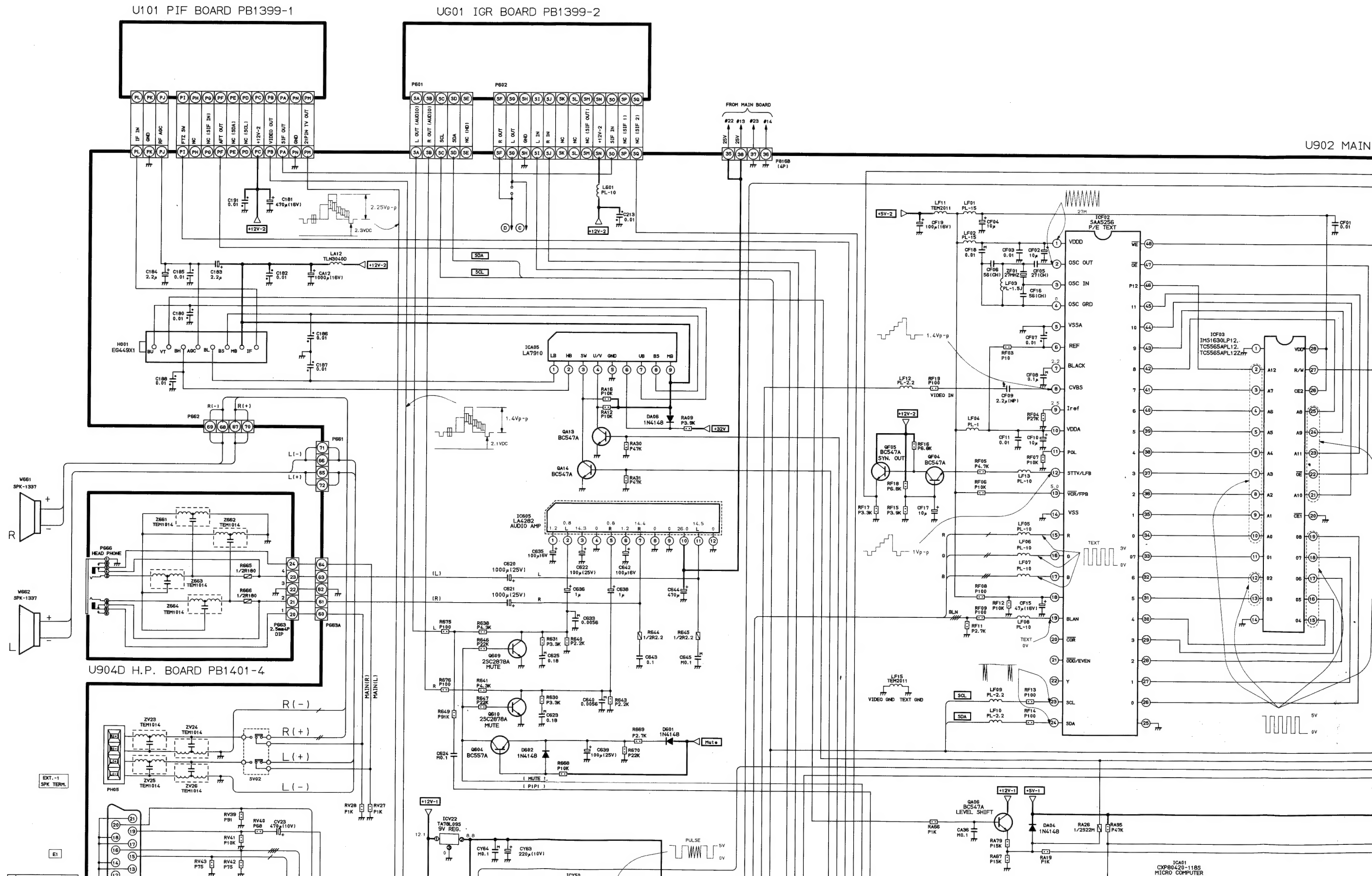


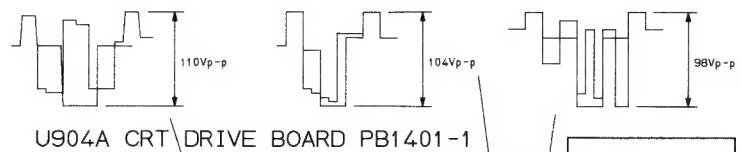




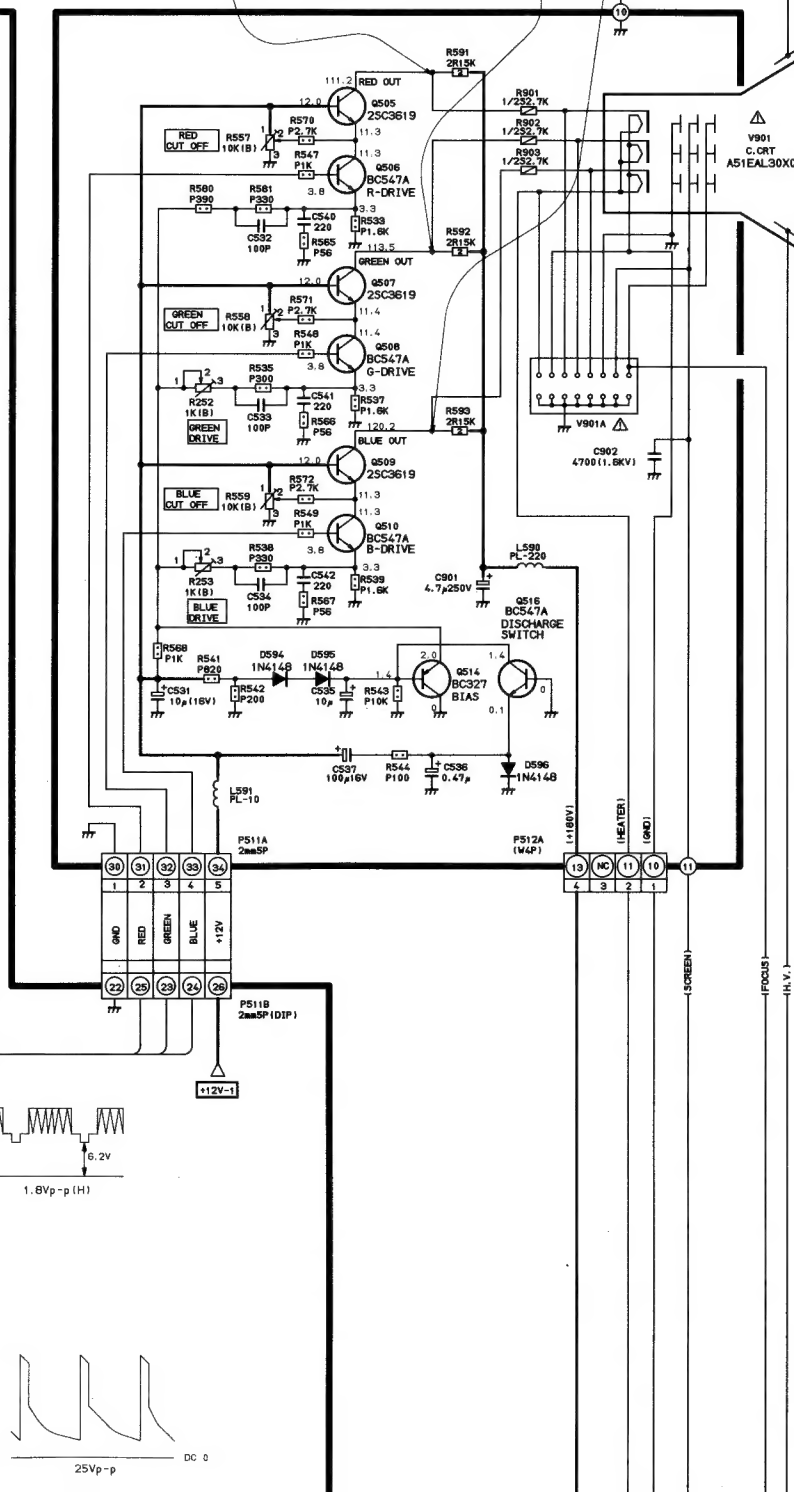
# 2112DDT

## SCHEMATIC DIAGRAM (1/2)





U904A CRT\DRIVE BOARD PB1401-1



21	SHIELD EARTH
20	VIDEO IN
19	VIDEO OUT
18	RAPID BLK EARTH
17	VIDEO EARTH
16	RAPID BLANKING
15	RED IN
14	NC
13	RED EARTH
12	NC
11	GREEN IN
10	NC
9	GREEN EARTH
8	EXT./TV
7	BLUE IN
6	AUDIO IN (L)
5	EARTH
4	AUDIO EARTH
3	AUDIO OUT (L)
2	AUDIO IN (R)
1	AUDIO OUT (R)

E1

E2

E3

